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With the Editor

Brunel's Timber Viaducts

I was sorry to hear a fortnight ago from the Great Western Railway that the last two of the remarkable series of timber viaducts built by their famous engineer Isambard Kingdom Brunel were being dismantled. These structures were built at Dare and Gamlyn in South Wales to carry the Dare Branch over deep valleys near Aberdare. The line was opened in 1855.

Brunel's timber viaducts, unique in their day in railway construction, are generally associated particularly with Devon and Cornwall, where the many valleys to be crossed by the line inspired their construction. But Brunel made his mark also in South Wales, having laid out the South Wales Railway to Milford Haven, a line sponsored by and finally absorbed into the G.W.R. in 1863, so providing the chief part of the present route to Fishguard. Timber viaducts were included among the principal South Wales engineering works, notably the Landore Viaduct at Swansea consisting of 37 spans. The Usk bridge at Newport, 1,200 ft. long, and the opening bridge at Carmarthen also were of timber. The latter, over the river Towy, was the most important of the opening bridges and had ten fixed spans, with two spans of 50 ft. clear waterway across which the drawbridge moved.

It has often been said of Brunel's timber viaducts that their slender, graceful spans, so far from spoiling the landscape, seemed to form part of it, and to add a note of beauty of their own. Some of them, over marshy ground, were all-timber structures; timber trusses, supported on timber piles that formed the piers, carried the decking. On good foundations Brunel built masonry piers 60 ft. to 66 ft. apart, carried up to 35 ft. below the level of the track. From the tops of the piers timber struts radiated fanwise upward to support the main carrying beams. Timber bracing was added as required.

The timber viaducts had a long and useful career. That at Collegewood, for instance, on the Falmouth Branch from Truro, had 71 years of service, carrying its last train in July 1934. One by one they have disappeared, however, being replaced by masonry or steel structures or by embankments. The last two became redundant when the Dare Branch was closed.

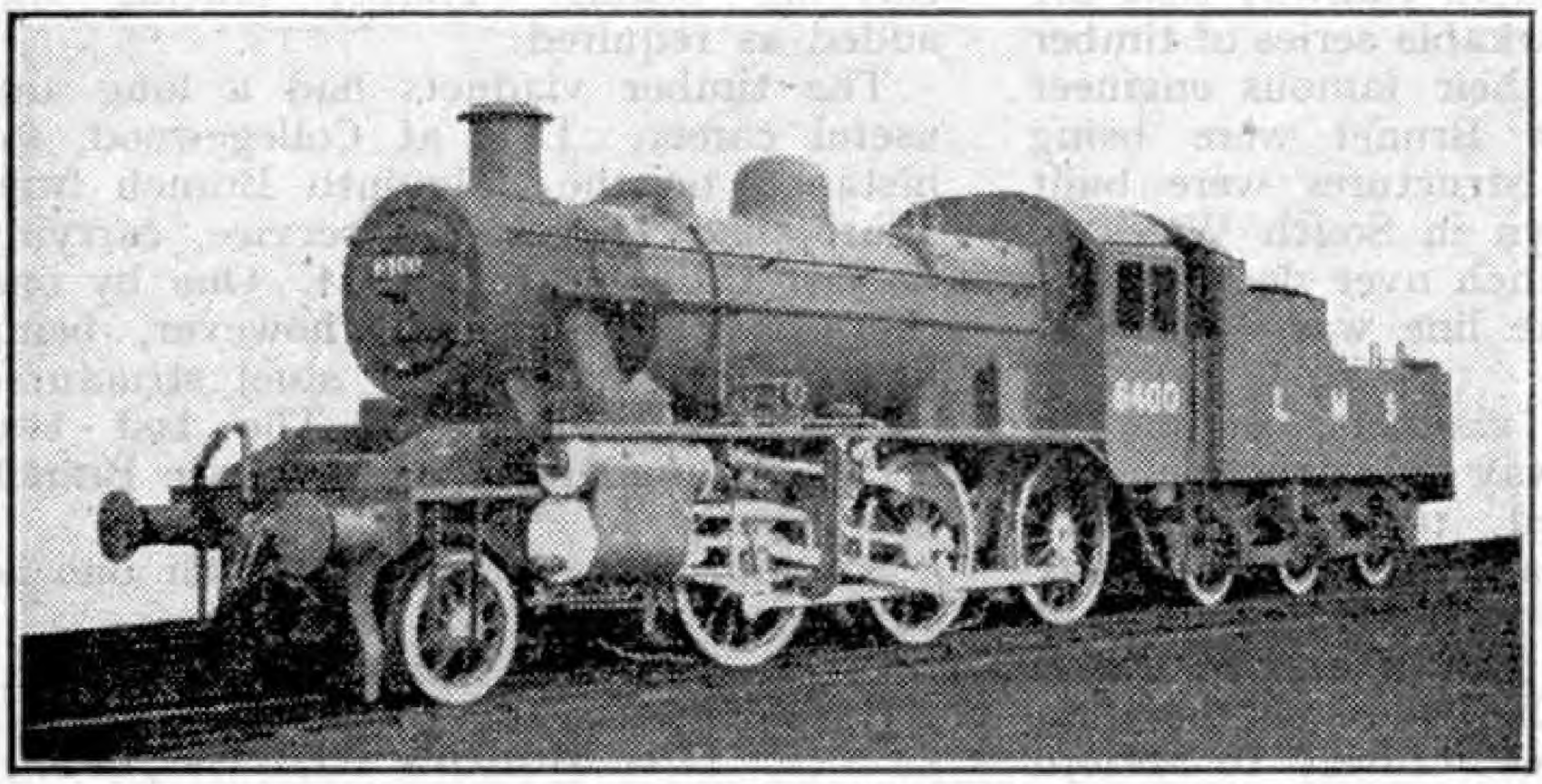
So vanishes another link with one of our greatest engineers.

This Month's Articles

New L.M.S. Tender and Tank Engines

Light Designs for Branch Lines

THERE have recently been put into service on the L.M.S., the two new locomotive designs shown in the accompanying illustrations. These tender and tank engines have been built at Crewe Works to the designs of the Chief Mechanical Engineer, Mr. H. G. Ivatt, M.I.Mech.E. The new classes at present consist of 10 engines each, and have been built to a specially light design with low axle weight so that they can run practically all over the system, including minor and lightly-laid branch lines.



L.M.S. No. 6400, the first of the new light 2-6-0s. The photographs to this article are reproduced by courtesy of the L.M.S.

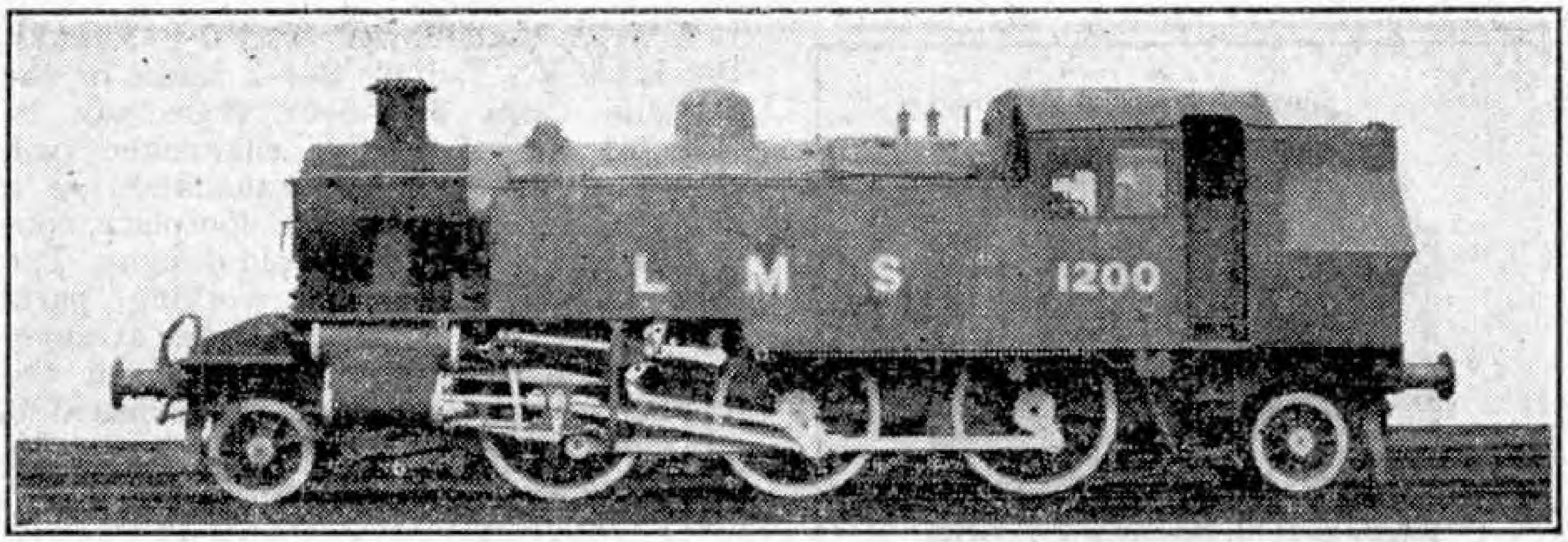
In general it has not been the practice in Britain to design and build new classes of engines for secondary services on cross-country and branch lines. There have been exceptions, but in the main old engines of sufficiently light axle loading have been employed, or even newly-built engines to old designs. Many a former main line "flyer" or goods engine has worked out its time on more or less humble branch line service. In fact, but for the war, a considerable number of engines of power class 2 of the L.M.S., would have become due for breaking up during the past seven years. Now these are gradually being withdrawn according to their condition, and the new engines will take their place.

Although of relatively small size and light weight, the new engines incorporate every modern development that has been found successful on the larger main line standard types. In order to obtain the fullest benefit from standardisation, it is desirable that secondary-service locomotives, equally with those on main line duties, should be capable of the highest attainable mileage between repairs; that they should be economical to run, and that they should be capable of being quickly and easily serviced at the shed.

The two new classes are identical in design except that one is a tender engine with the 2–6–0 wheel arrangement, and the other a 2–6–2 side tank. Both are intended for mixed traffic work and are thus in keeping with the modern trend in designing engines fit to perform a wide range of duties. The tender engine is intended mainly for cross-country and light main line passenger and freight work where greater coal and water capacity is required, but the tank engine is more for branch line work, even including "push and pull" or motor-train services.

On each class of engine outside cylinders are employed, having a diameter of 16 in. and a piston stroke of 24 in. Piston valves operated by Walschaerts valve gear control the steam distribution. Some of the valve gear and the reversing connections have hardened steel bushes and pins, grease-lubricated. The remaining links and details have phosphor bronze bushes, oil-lubricated. The crosshead is of a new built-up design in order to save weight.

The drive from the cylinders is taken to the centre pair of six-coupled driving wheels, which have a diameter of 5 ft. For the leading wheels of both classes the same design of truck is used, with bar frames and swing link control. The necessary damping of the side movement is provided by a spring-loaded friction retarder. The trailing truck of the tank engine is of a similar design but has spring side control.

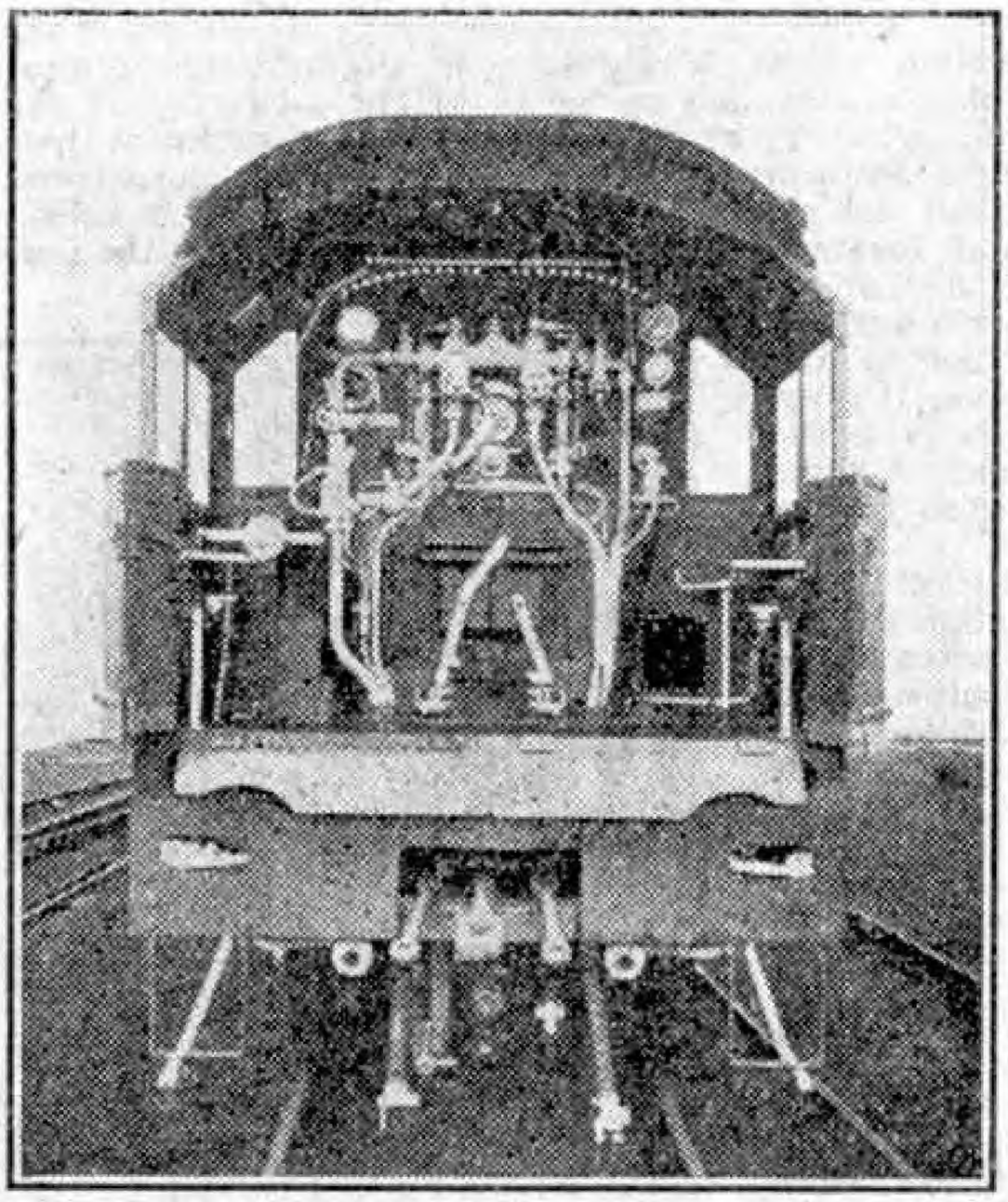


The neat and workmanlike appearance of the new 2-6-2 tanks is well shown in this illustration. The upper part of the bunker is set in to afford a good view when travelling backward.

Mechanical lubricators for cylinders and engine axle-boxes are provided, with steam sanding gear, and the usual L.M.S. arrangement of the steam brake with vacuum brake fittings for the train controlled by the standard driver's combined brake valve. In addition there are steam heating fittings for passenger train work.

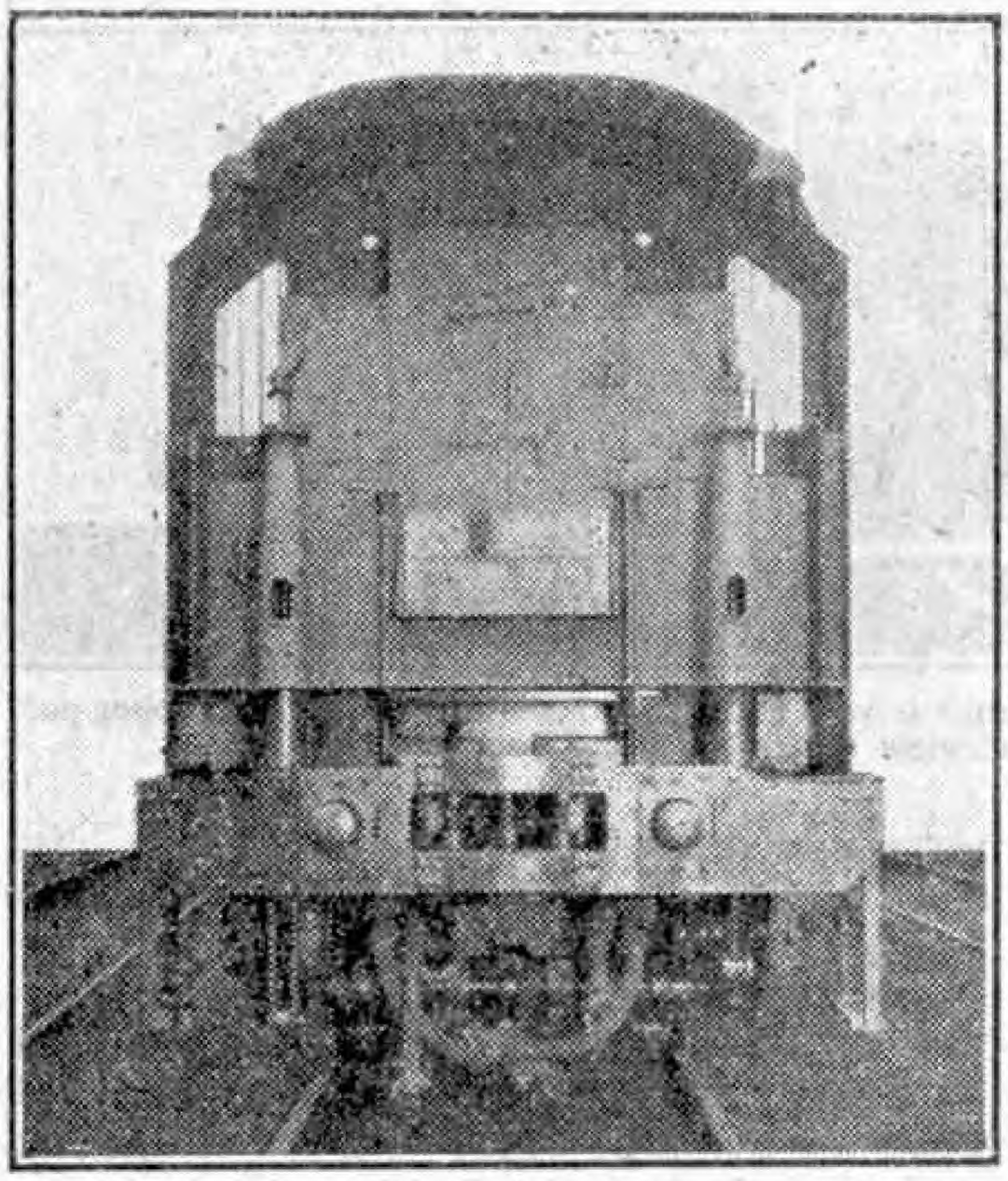
The boiler has a tapered barrel and a Belpaire fire-box, with a 12-element superheater. The smoke-box is circular and is supported by a saddle. Following recent L.M.S. practice, the smoke-box is designed to be self-cleaning, as indicated by the letters "*SC*" that appear on the lower part of the door. Internal plates and a wire mesh grid are arranged in such a way as to throw out through the chimney all accumulations of smoke-box ash or "char" when the engine is working. Another new development that is being applied on L.M.S. engines is the rocking grate. This consists of six rocking sections divided into two groups of three fore and aft, which can be rocked independently. The operating gear is arranged so that the grate can be merely shaken when necessary out on the road, or can be fully rocked for fire-dropping purposes when the engine is over a pit. The ashpan also is of the self-emptying type with two bottom doors operated by a lever from the ground. The incorporation of these arrangements is intended to ease the manual labour, and therefore speed-up disposal operations between one turn of duty and the next.

The tender of the 2–6–0 engine is of quite a new design and is specially arranged to give good conditions for the tender-first working often necessary on branch lines. Thus a tender cab is provided, of which there have been very few examples in British practice. Instead of having high built-up sides, the water tank of the tender has been kept low, while the coal bunker has its sides set in from the edge of the tank in order to afford a good view from the footplate through the rear spectacles. The tender carries 3,000 gallons of water and four tons of coal and has water pick-up apparatus. The tank engine carries 1,350 gallons of water in its side tanks and three tons of coal. The upper parts of the bunker sides of the tank engine are set in.



Interior view of the cab. Note the pocket or tunnel for the fire-irons, which appears as a black patch on the right-hand side.

Privileged inspection of the engines at Crewe Works through the



The front of the tender of the 2-6-0 engine showing the enclosed cab.

courtesy of the L.M.S. showed that the footplates are roomy and the fittings well arranged. However much one may regret the passing of such old stalwarts as the L.N.W.R. "Cauliflower" and 0–6–2 tanks, the L. & Y. "radial" 2–4–2 tanks or the Midland Class 2 0–6–0s, there can be little doubt that the enginemen will welcome their new accommodation as a change from the Spartan footplate conditions found on so many old designs. The greater accessibility of working parts afforded by the outside cylinder arrangement is another point, apart from the labour-saving features previously referred to.

Among the less obvious details the fitting of a ladder, at the rear of the tender and bunker respectively, is an improvement on the precarious footing afforded by steps, or by the lamp brackets often made use of by the fireman when he has to "get up on top." Another convenience is the location of the sieve or "cage" that acts as a strainer for the water supply between the tanks and the injectors. Previously this has been inside the tanks, but now it is placed outside and easily got at, a point that both shed staff and the footplate men will appreciate.

Externally these new L.M.S. productions have a neat and workmanlike appearance in the black livery now standard.

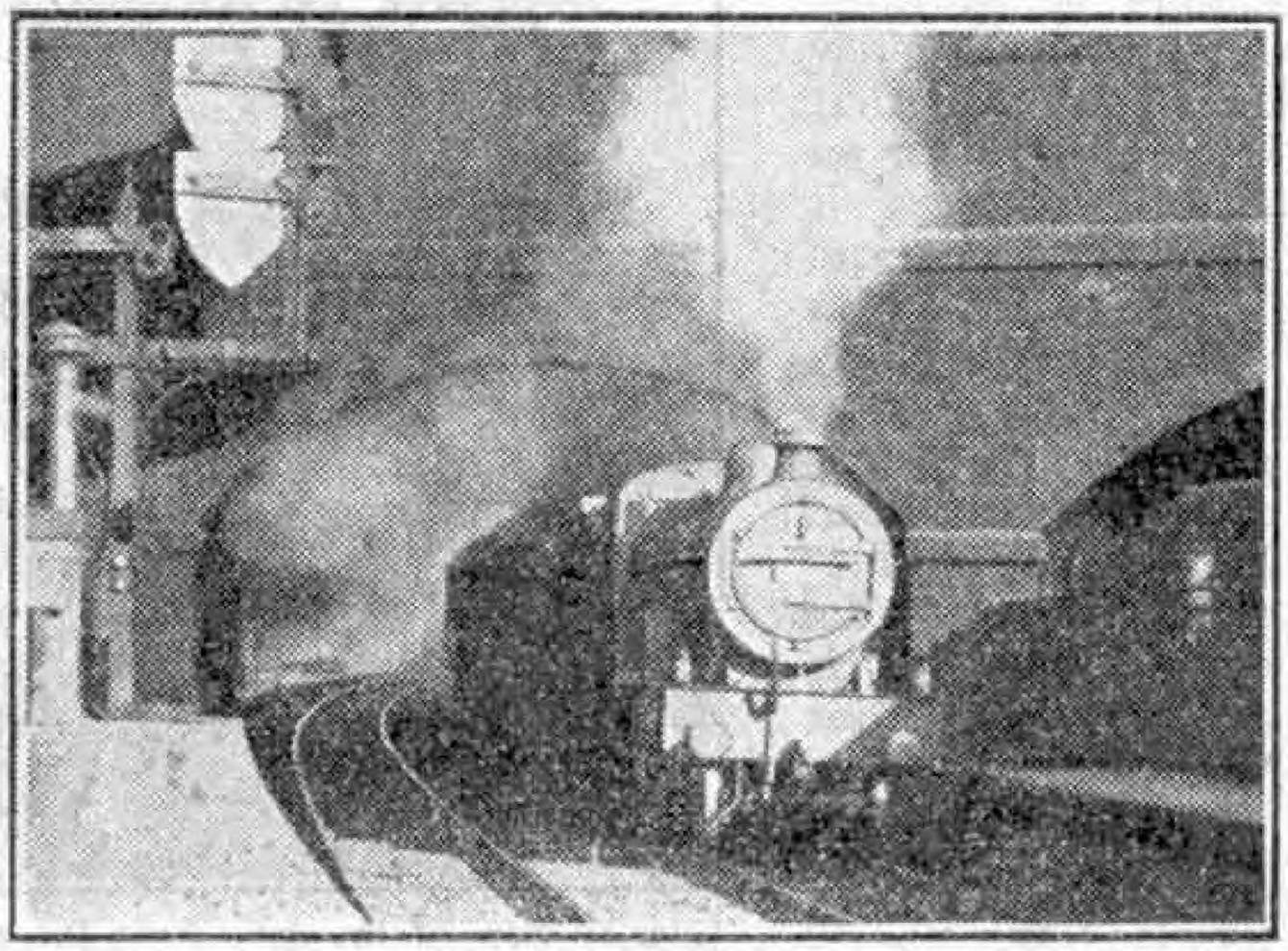
The weight in working order of the 2–6–0 with its tender is 84 tons 5 cwt., and that of the tank engine 63 tons 5 cwt.

An Unusual Signal

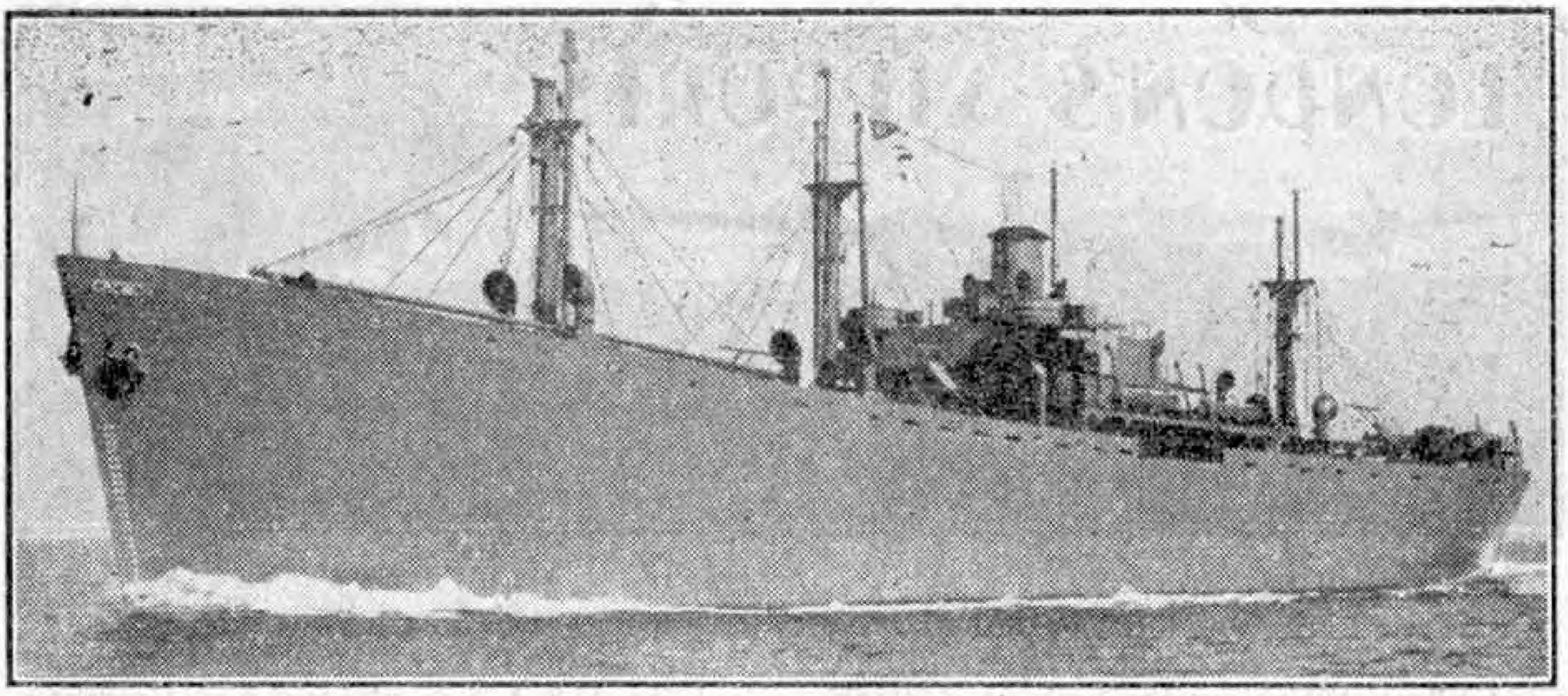
The accompanying illustration shows a signal at the southern end of Kentish Town Station on the Midland Section of the L.M.S., which is unusual in having on the same post two distant arms one above the other. Often where sections are short, a home and a distant arm are found together, the home always above the distant. A distant, as most readers will know, acts as a warning signal, and can be passed when in the horizontal or "caution" position. It gives the driver advance information as to the position of the next home signal. A home signal must not be passed when in the danger or "stop" position.

If a combined home and distant signal had been installed at the location shown, however, trouble would have arisen owing to the position of the water column seen beyond the platform end. If the home arm were at "danger," tender engines using the column would have to overrun the signal and enter the next up main line section. So the home signal is placed out beyond the rather long bridge shown and cannot be seen until closely approached. The upper distant arm on the platform therefore acts as a repeater to this, being operated by the same wire. The lower distant arm refers to the main line route home signal at a junction ahead while the separate distant on the small post to the left refers to the diverging road at the same junction.

In addition to this collection of distant signals shown in the photograph, there is an ordinary outer distant at the northern end of the platform. If this shows "line clear" drivers of fast trains know that a clear run through as far as the junction is assured. To assist them, sighting boards provide a light background for the platform distants against the dark bulk of the bridge.



The curious signal at Kentish Town L.M.S. the use of which is explained on this page. Photograph by A. G. Williamson.



A Liberty Ship.

The Famous Liberty Ships

By Denis Rebbeck, M.A . M.Sc., B.Litt., M.I.N.A., A.M.I.Mech.E.

THE United States Maritime Commission design EC2-S-C1 cargo vessel, better known as the Liberty Ship, is a single-screw steamer with a length between perpendiculars of 416 ft., a length overall of 441 ft. 6 in., a maximum beam of 57 ft. and a moulded depth to the upper deck of 37 ft. 4 in. It has a displacement to the load waterline of 14,100 tons and a deadweight carrying capacity of 10,800 tons. It has two complete decks, a raked stem and an elliptical cruiser stern. Eight main transverse watertight bulkheads subdivide the hull into five cargo holds and an engine and boiler room, while a pleasing appearance is given to the vessel by the upper deck having both sheer and camber.

This cold statement of facts ushers in a type of ship which caused more controversy during the second World War, and which will continue to raise more controversial topics wherever men discuss merchant ships and surplus tonnage, than any other type of cargo ship has ever done.

Designed in 1941, when the United States' marine engineering industry could handle only orders for naval vessels, the Liberty ships had to be equipped with steam reciprocating engines of standardised type and low power. Rapid output in large numbers was the primary consideration. Known originally as the "ugly ducklings," Liberty ships saved the Allies from disaster at a time when sinkings were outstripping new construction.

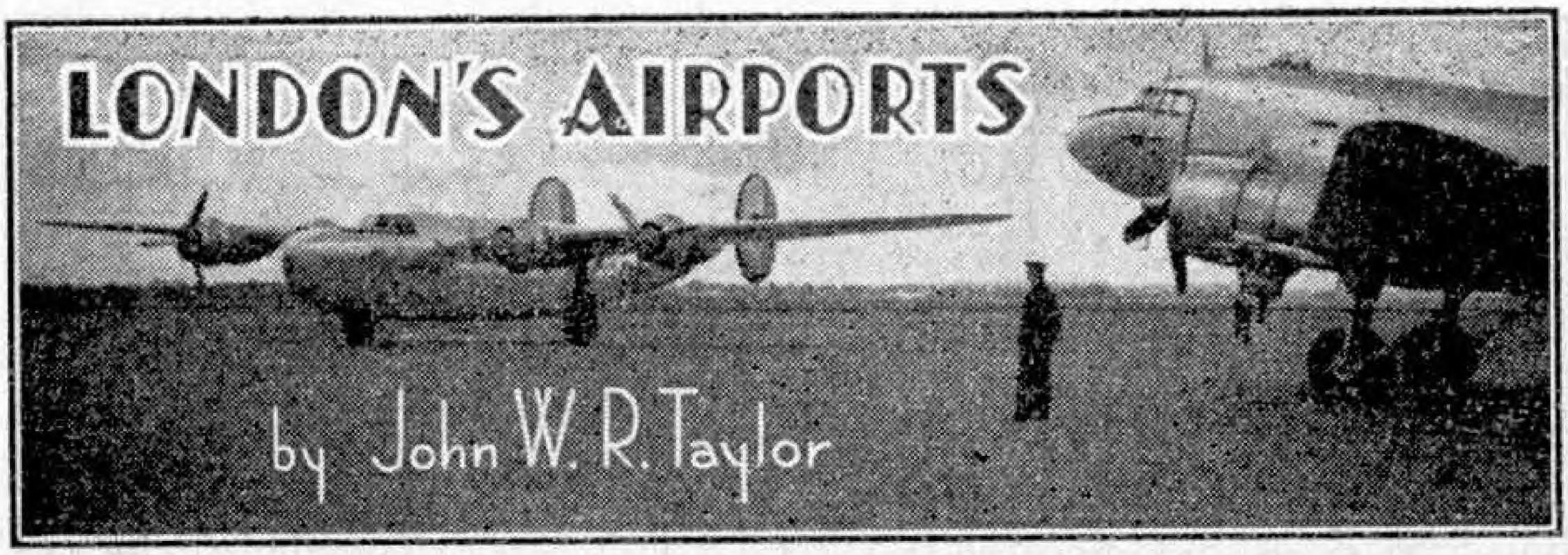
The main propelling machinery is located in a single machinery space amidships and consists of a three-cylinder triple-expansion steam engine developing about 2,500 I.H.P. at 76 r.p.m. Steam is supplied by two water-tube boilers at 220 lb. per sq. in., and the ship has a sustained speed, under sea conditions, of over 11.5 knots.

The structural design of the Liberty ship was distinguished by two features in particular—the extensive use of welded construction, and the structural arrangement which allowed the hull to be broken up into large sub-assemblies. Welding enabled American shipyards to turn out Liberty ships in one-third less time than it would have taken to hammer the million rivets required in a similar-sized ship during the first World War.

The withdrawal of merchant fleets of many countries from the trade routes, and the demands of the Armed forces, threw an ever-increasing burden on the Allied Merchant marine in the early stages of the war, and the answer was eventually found in the 2,714 Liberty ships which in time provided four out of every five vessels in the United Nations' convoys.

The first Liberty ship was put into service on 30th December 1941; the last, the 2,714th, was launched in May 1945.

Though eventually superseded by the faster "Victory" ship, and now lying at anchor in their hundreds in many a lonely creek, unwanted and forgotten, Liberty ships bore the brunt of transporting supplies to the fighting fronts of the United Nations.

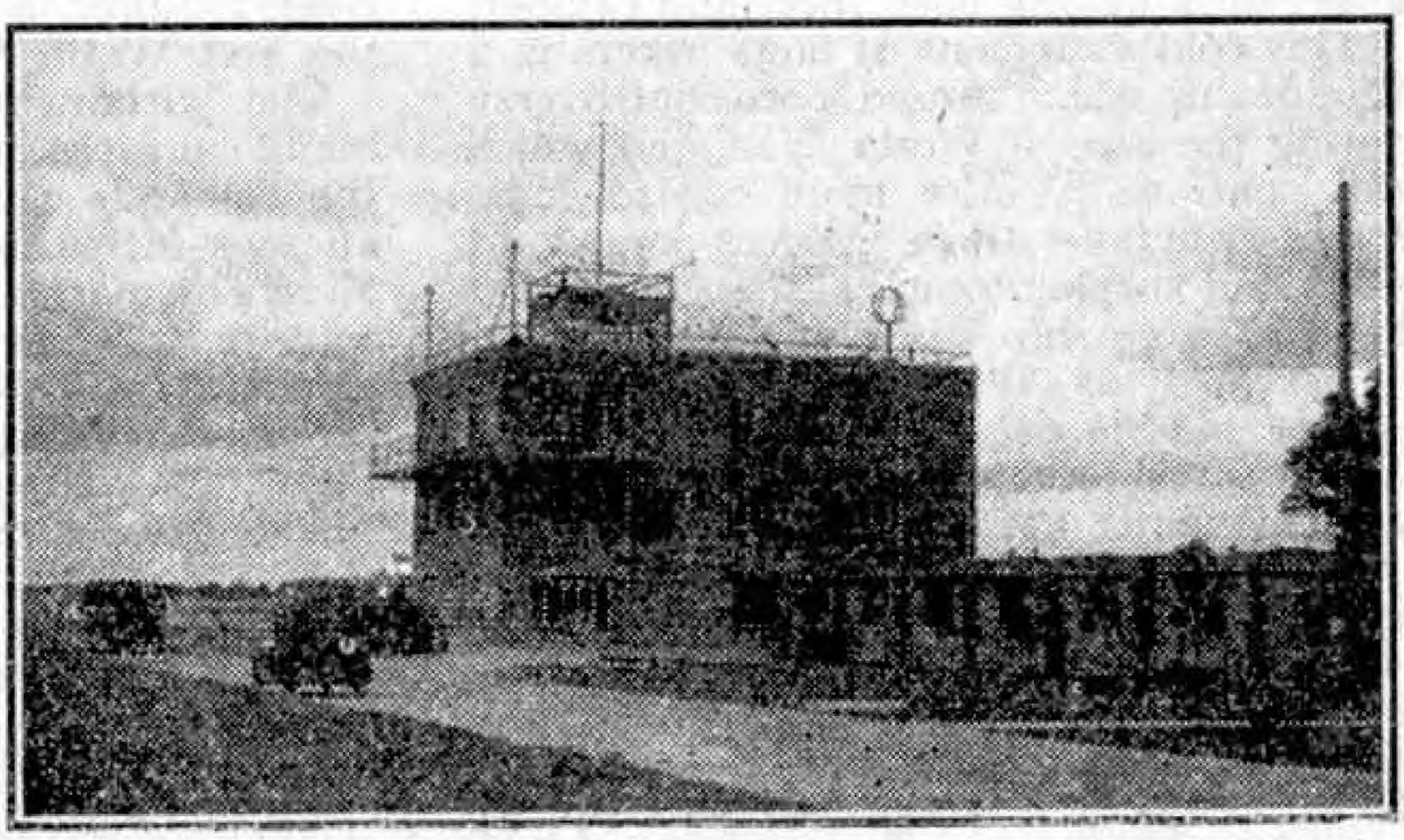


"SO you think Croydon has had its day, do you?" asked the Airport Traffic Controller. "Well, we've had over 22,000 landings and take-offs in the last four months. Personally, I don't think that's too bad for an aerodrome that the newspapers call 'out of date,' 'dangerous' and 'too small'." We agreed, and felt a little uncomfortable.

A few weeks earlier my wife and I had decided to visit London's three airports at Heath Row, Northolt and Croydon to see how British civil aviation is shaping in the second year of peace. We decided to leave Croydon until last, for the vast newness of Heath Row was very tempting, and Northolt with its still fresh memories of the Battle of Britain and fighter sweeps seemed rather exciting. On the other hand, although it was London's only big air terminus in 1939, Croydon was getting a little out of date even then. This was inevitable, for aviation made such tremendous progress between the wars that the airfield from which so many air routes were pioneered was bound to be inadequate when the routes blossomed into the fullness of the world's greatest airline network.

Then, a few years ago, when the Allies were well on the way to winning the war, a vast new aerodrome began to take shape at Heath Row in Middlesex, engulfing the small but very fine airfield owned by the Fairey Aviation Company. Few people took very seriously the Government's statements that Heath Row was a bomber 'drome—for R.A.F. Bomber Command and the U.S.A.A.F. already had Germany by the throat. In fact it seemed most unlikely that the war would last long enough for Heath Row ever to become operational.

Eventually it was announced officially that Heath Row was intended for civil use and was to be called London Airport. And, when details of the state-controlled British post-war airlines were given, the part the new airport would play was also made clear. It was to become the terminus for all Atlantic and Empire air routes operated by landplanes, and would be used by the British Overseas Airways and British South American Airways Corporations. The third Corporation—British European Airways—would use Northolt, which had already changed hands from Fighter Command to Transport Command. This scheme appeared to leave Croydon out in the cold, but it was realised that several foreign airlines would continue to



The Control Tower at Heath Row Airport. On the right are the administrative and passenger buildings. The title illustration shows a B.O.A.C. "Liberator" arriving at this airport from Dorval, in Canada.

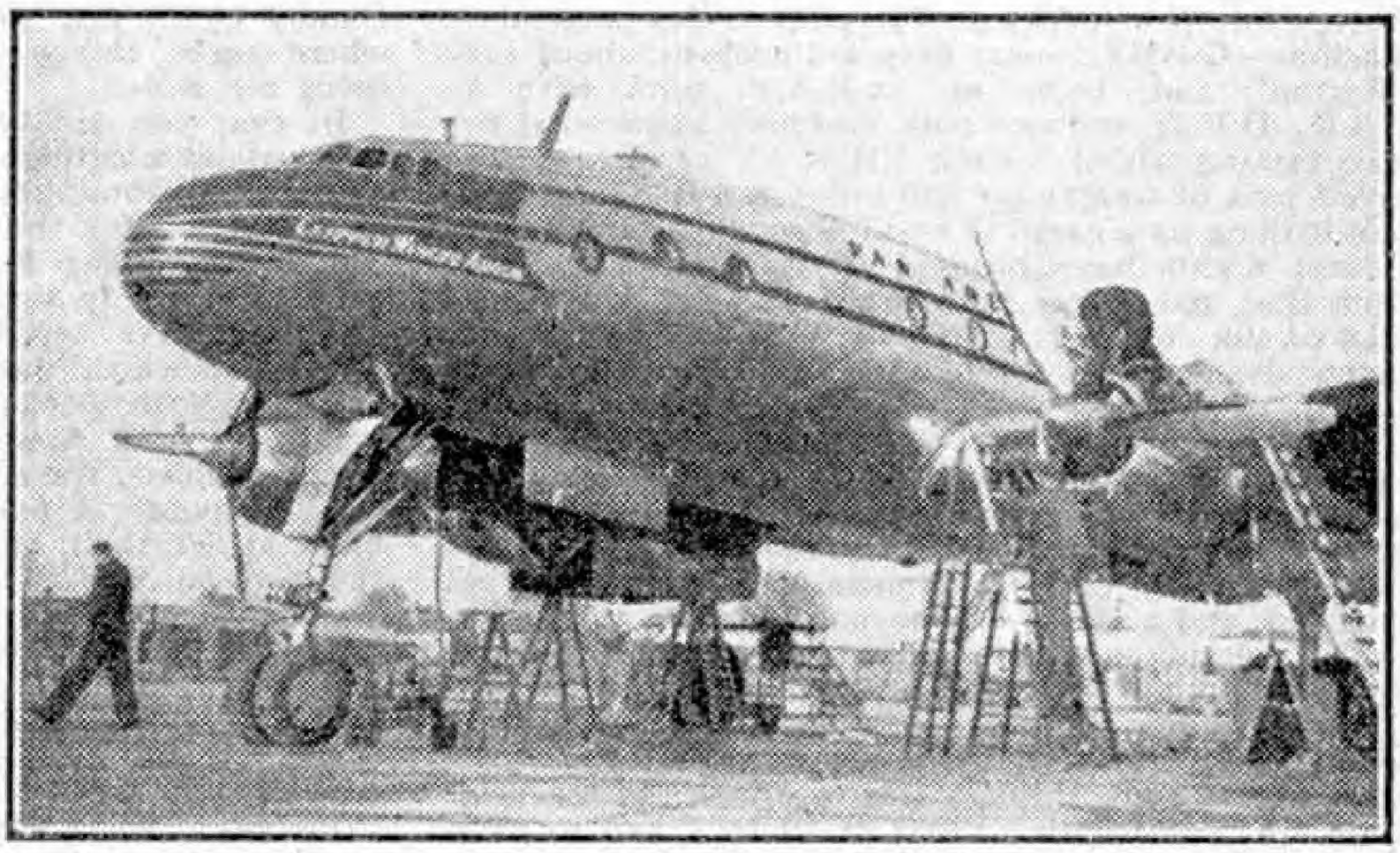
use this 'drome and that it was an ideal H.Q. for British charter firms using smaller types of aircraft. So everyone was happy—in fact the Croydon people are almost glad that the regular airlines are leaving, for they find the increasing volume of charter traffic more than enough to keep the wolf from the door.

Foreign airline operators have followed roughly the British set-up. As a result transatlantic lines such as the American Trans World Airlines, Pan American Airways, American Overseas Airways and the Brazilian Panair do Brazil now use Heath Row, all of them operating the large "Constellations" and "Skymasters." The "Dakotas" and "Skymasters" of the Eirran Aer Lingus, Danish D.D.L., Norwegian D.N.L., Swedish A.B.A., Polish and Spanish Iberian airlines and Swissair operate to and from Northolt; while the "Dakotas" of the Belgian Sabena, Dutch K.L.M., Air France and Czech airlines continue for a time to use Croydon.

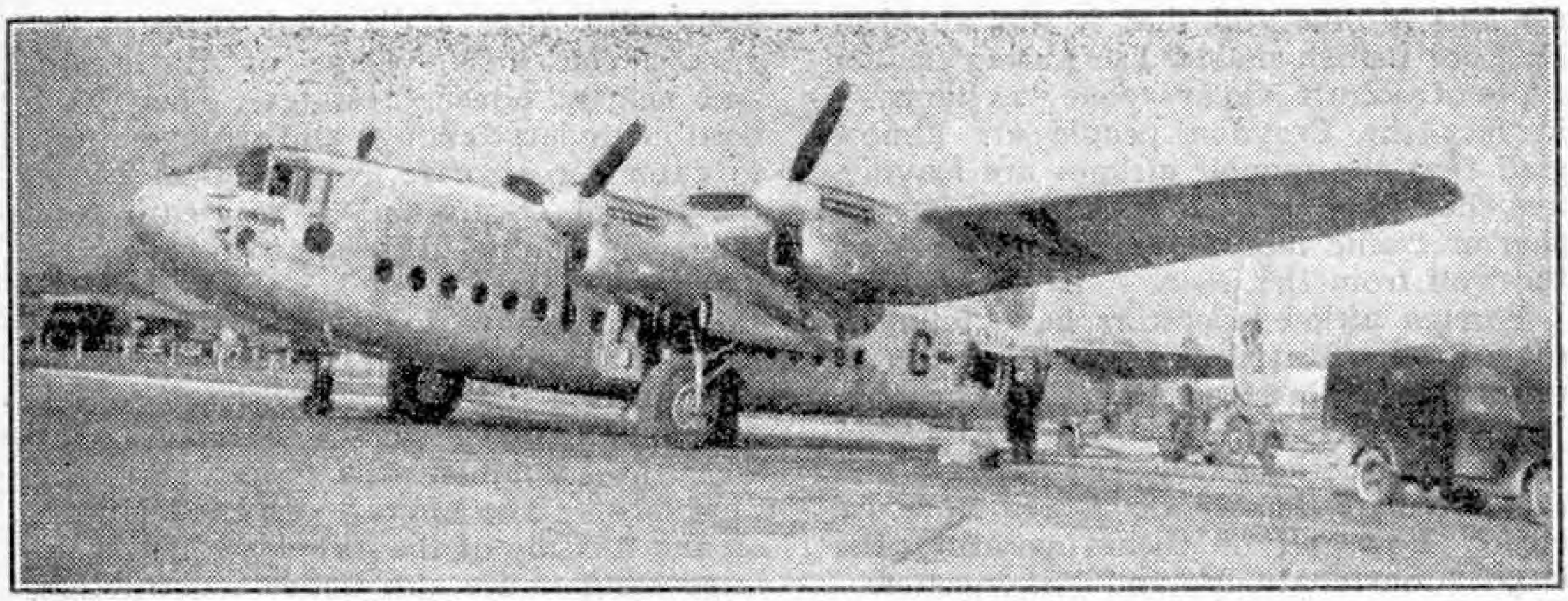
When we visited Heath Row the notorious tents that originally constituted the passenger accommodation were just giving way to new prefabricated buildings. There had been much criticism of the tents in the daily press but we found them cosy and homely. It was Autumn and they were well lit, decorated with fresh flowers, warm and airy—as a temporary measure during the Summer months they had done a big job well. A fact that most critics failed to appreciate is that it was quite an achievement to get a new airfield of the size of Heath Row operating at all so soon after the end of the war.

It is laid out with R.A.F.-pattern runways, at present forming a triangle, with the longest side—9,000 ft. long—running parallel with the Bath Road from which the public can get a good view of the activity at the airport. This gave rise to a local legend, before full radio approach facilities were working, that pilots put their wheels and flaps down opposite the "George and Crown," throttle back at the Police Station and touch down by "Joe's Joint!" The runways will, however, eventually form a diamond pattern, engulfing the little village of Harlington and nearby housing estates. They have been made large enough and strong enough to cater for aircraft five times as big as the Bristol "Brabazon" I, so Heath Row is hardly likely to become out of date quickly.

The aircraft park is between the main runway and the road. By the side of this park are the R.A.F.-type red-brick control tower, illustrated on the previous page, and the administrative and passenger "pre-fabs." The aircraft dispersal park is on the far side of the airfield, where some large hangars are also under construction. At present B.O.A.C. maintenance is being done at Hurn, Whitchurch, near Bristol, and Bovingdon, Herts., and B.S.A.A. maintenance in the ex-Hawker flight-sheds at Langley. There are, of course, full facilities for normal "between flights" servicing at Heath Row. While we were there, aircraft lined up on the parking area included the Pan American "Constellation" *"Clipper Winged Arrow"* which was being re-fuelled and having its engines inspected before leaving again for America. Next to it was a handsome Skyways "York" *"Sky Courier,"* ready for its next charter flight. The famous B.S.A.A. "Lancastrian" *"Star Light,"* which made the first official flight from Heath Row to Buenos Aires, on 1st January 1946, had just landed and was disgorging passengers and freight, while behind it was an inevitable "Dakota" of B.O.A.C. and an Avro XIX. The last aircraft we inspected was a "Halton" belonging to London Aero and Motor



Servicing Pan American Airways' "Clipper Winged Arrow," a Lockheed "Constellation" aircraft.



"Sky Courier," an Avro "York" used for charter service by Skyways.

Services — a very progressive charter company, specialising in high-speed export and import flights to Europe and North Africa. The pilot of this particular machine—G-AHZL—was very enthusiastic about the "Halton" and, being an ex-R.A.F. pilot with a D.S.O., D.F.C., and two bars, certainly knew what he was talking about. Each "Halton" carries up to seven tons of freight for 900 miles and G-AHZL was just loading up a cargo of woollen goods for Denmark. Recent flights have brought to England tangerines from Bari and grapes from France, and have taken a load of silk stockings to Norway—a fact that caused much dismay to my wife and, I expect, most other British womenfolk!

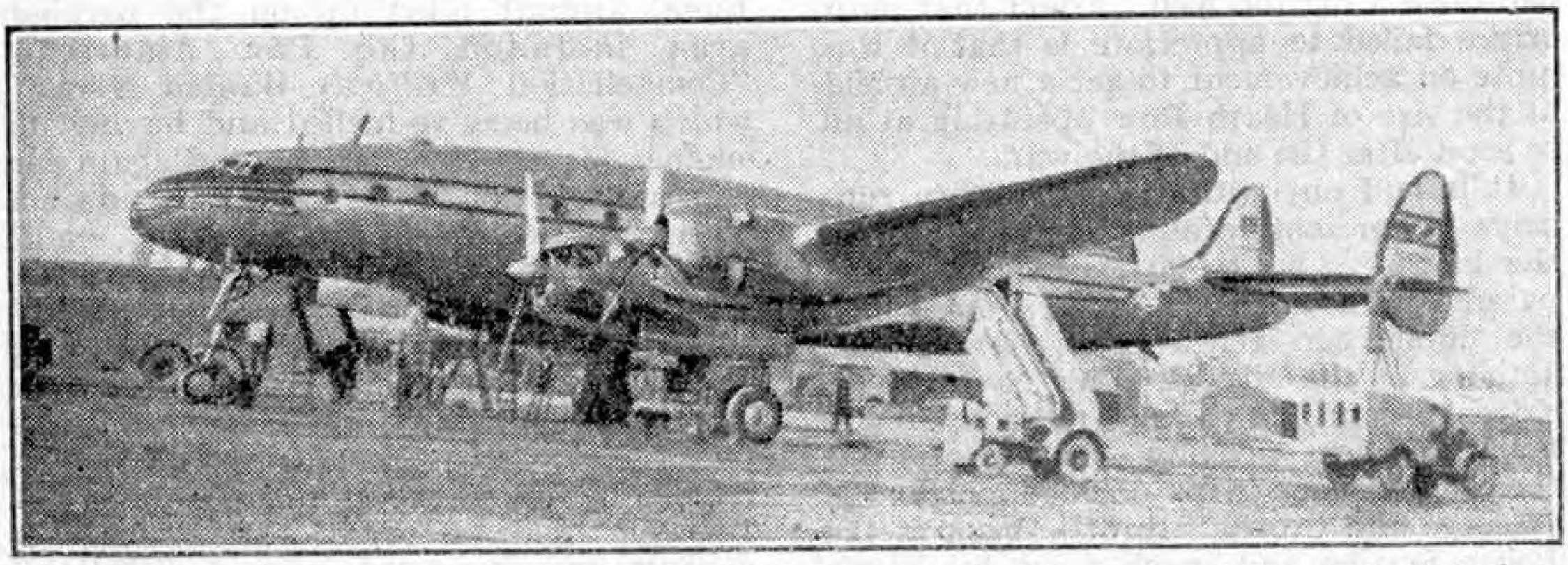
The second aerodrome on the list—Northolt—was very different from Heath Row, but had the same atmosphere of business-like efficiency. Here also accommodation consisted of "pre-fabs," comfortably furnished with carpets, armchairs, curtains at the windows and a series of fine paintings on the walls, each depicting a different European capital with a B.E.A. "Viking" flying over it.

We saw one of these "Vikings" landing outside, and decided to watch the passengers disembark and then follow them through the "pre-fabs" to see how they are "dealt with." First of all they had to pass through Customs, and here one of the first legacies of the war came to light when purchase tax was payable on some goods as well as Customs duty. Having negotiated the first obstacle with varying degrees of success, the passengers next filled in a little form for the health authorities. This is aimed chiefly at preventing the introduction into England of such things as smallpox and typhoid, and should a passenger become ill shortly after arrival in England the health authorities must be informed so that action can be taken in respect of other passengers in the same aircraft who may also be affected. Finally comes the visit to the Immigration Officer, where such things as ration books and identity cards are issued.

In case you are beginning to think that all this takes about a fortnight to complete, it may be well to add that the total time that elapsed between the first passenger leaving the aircraft and the last passenger climbing into the B.O.A.C. coach and leaving for London was only some 22 minutes.

At all three aerodromes there are well stocked buffets at which passengers can get a snack, also W. H. Smith bookstalls displaying all the latest magazines and such things as tooth-brushes for absent-minded travellers, and chocolate—yes, you need coupons! A fine new restaurant is now being built at Northolt and may eventually be open to the general public as well as to passengers. Its kitchen equipment includes electric cookers and dish-washing machines that would gladden the heart of any housewife, and there will be separate cafeterias for the aircrews and airport personnel.

Out on the airfield was a varied assortment of aircraft but with the inevitable preponderance of "Dakotas." There was a Swedish A.B.A. "Skymaster," a Norwegian charter-service Beechcraft biplane, several B.E.A. "Vikings," Channel Islands Airways' "Wayfarer," and "Daks" belonging to Aer Lingus, D.N.L., Polish Airlines and UNRRA. The main runway at Northolt is 5,500 ft. long and is quite adequate for aircraft of "Skymaster" size. Only one of the other runways is used, as Northolt was an R.A.F. fighter airfield and consequently the remainder are considered too short for heavily loaded air liners. The R.A.F. has not (*Continued on page 94*)

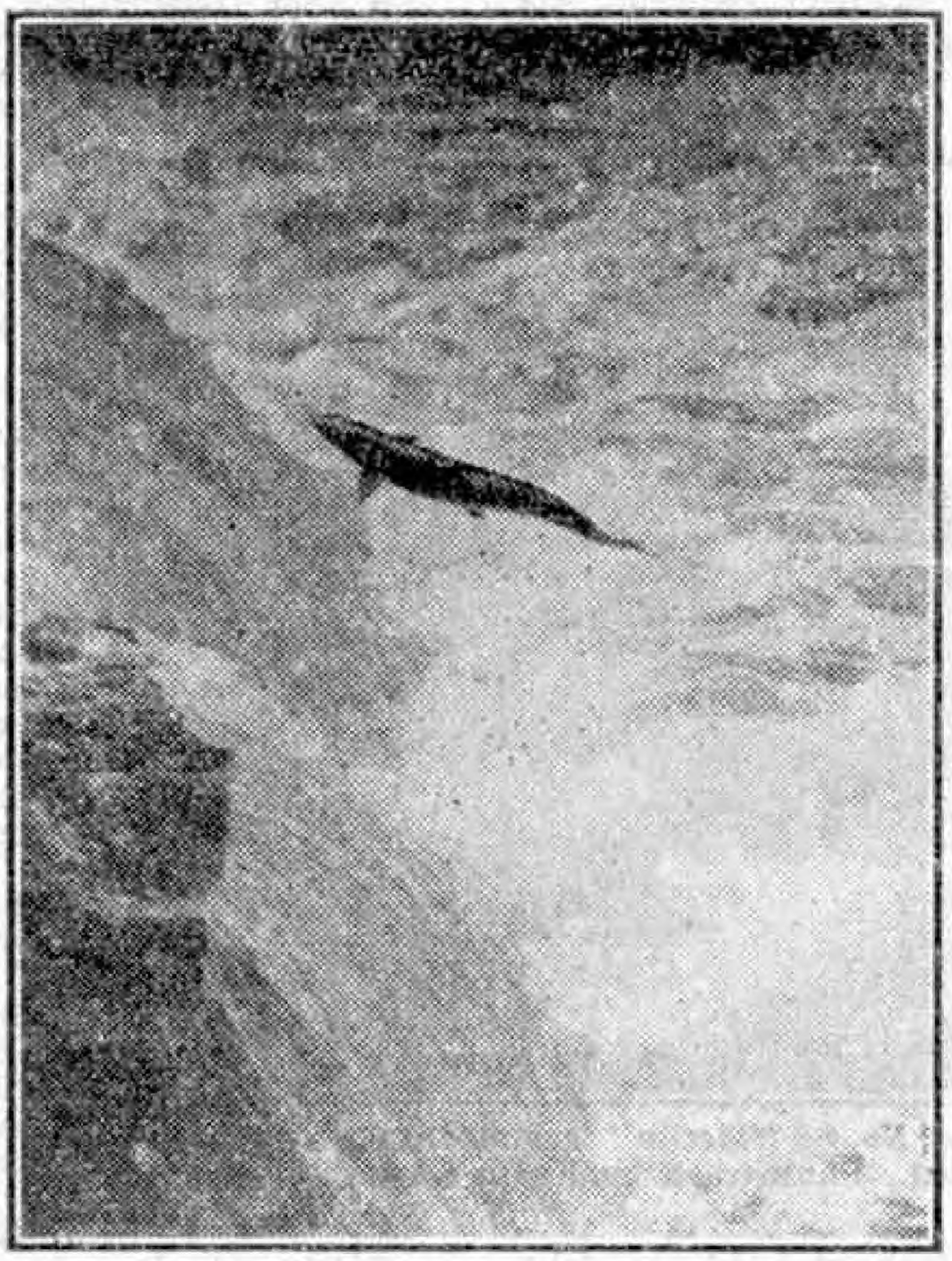


Another view of P.A.A.'s "Clipper Winged Arrow" being serviced at Heath Row before a flight back to the United States.

The Strength of Salmon

By R. H. Ferry, F.Z.S.

HOW does a heavy salmon hold its own against the volume and current of rushing water? Buckland, the famous naturalist, pointed out that a "fish out of water" is a very different creature from the fish in its natural element. He weighed several freshly-killed fish, first out of the water and then submerged. A 9 lb. fish weighed only ¼ lb. when hung in brackish water, and a 19 lb. fish weighed in clear water at a temperature of 64 deg. F. registered only 1¼ lb. It will be seen therefore that the salmon's whole muscular effort can be given to fighting the current, since little energy is required to support its own weight. Coupled with this, the beautifully streamlined form of fish offers little resistance to the flow of the water.



Salmon leaping at Pots of Gartness on the Endrick at Killearn, Stirlingshire.

Buckland made several experiments as to the actual "pull and power" of salmon. After a great deal of difficulty in satisfactorily harnessing a salmon, he succeeded in attaching a cord round the "tail neck" or "wrist" of a fish. The other end of the cord was attached to a spring balance fastening at his belt in such a way that he could read the scale.

The first plunge pulled the weighing scale out to 23 lb.; the succeeding pulls registered 20 lb. and 15 lb., and then hardly anything at all. Anglers agree that the first rush of salmon is the dangerous one. In these experiments the fish was free at the head; a fish hooked in the mouth would have far less power.

With the aid of a friend and a stop watch, Buckland succeeded in taking a salmon's heart beats with his finger tips while it lay in a pool, and found that there were 92 to the minute. By watching the movements of its gills, he counted 77 respirations to the minute. The fish had been chased round the pool, however, and no doubt was excited and a little breathless.

It has been suggested that salmon descend to the sea tail first so that they may better memorise the journey for their ascent later. But it is more probable that this "backward progress" is again a matter of expended energy. The salmon facing up stream allows the water to come into its mouth, pass through its gills and out at the back of them. When facing down stream, this water has to be pumped out against the flow of the river. In this position the salmon would soon become exhausted and ultimately "drowned." Even when returning over waterfalls the salmon goes tail first, the tail acting as a concussion pad to the fall.

Salmon ladders, which might more sensibly be called "stairs," are constructed to aid salmon in their dangerous journeys up stream to the spawning beds, where obstacles such as dams for power stations intervene. But young salmon par seem able to pass through the water turbines of power stations without harm.

One often sees photographic studies of salmon making prodigious leaps. It is doubtful if they can jump higher than 5 ft. even with a good take off, however, and it is remarkable that they have the strength to do any acrobatic stunts at all in the face of their complete fast in fresh water. That salmon continue to live in our rivers says much for their strength and stout-heartedness, for there are thousands of natural obstacles to their ascent of a river and their return to the sea as well as the ever-increasing number of artificial impediments.

Railway Notes

L.N.E.R. Development Programme

The railways suffered heavily from the strain of war. The results to-day are shortage of modern passenger and goods rolling stock, large numbers of locomotives overdue for repairs, many miles of track needing renewal, and stations, depots or other buildings awaiting repair, rebuilding and repainting. Materials are still scarce and expensive, and skilled workpeople are not yet available in sufficient numbers. Nevertheless the L.N.E.R. have an accumulated fund of nearly £40,000,000 available for covering the cost of making good some of the arrears of maintenance. In addition to this huge task, a new works programme has been planned requiring the expenditure of another £50,000,000, though even that enormous figure excludes the cost of electrification schemes, additional rolling stock planned, and other improvements it is hoped to effect some day.

G.N.R. (I) 3-cylinder compound No. 85 "Merlin" leaving Dundalk for Dublin with an express from Belfast. Photograph by Kevin Gaynor, Dundalk.

Last year 579 miles of track were completely or partially renewed, including another 20 miles laid with the new flat-bottomed rails. Over 300 stations, goods depots and other buildings are being repainted at a cost of nearly £250,000. Many stations are to be rebuilt; tracks are to be widened, that is to say, additional sets of rails laid down for goods or slow traffic; and new locomotive sheds, marshalling yards and offices are to be built. There are to be up-to-date glass-fronted booking offices, and light, modernised signal boxes and refreshment and waiting rooms.

Electrification on the overhead conductor system is to be effected between Manchester, Wath and Sheffield, and also in the London suburban area from Liverpool Street to Shenfield. Work begun on these schemes just before the outbreak of war will be pushed forward. The first extension of the London Underground Central line from Liverpool Street in tunnel to Stratford, L.N.E.R., has been opened.

The building of another 500 locomotives during the next five years is planned, in addition to the construction of a further 500 by contractors. Corresponding figures for carriages are 2,100 and 3,400, and for wagons 50,000 and 20,000; 1,500 riveted steel wagons for the L.N.E.R. are under construction at the Ashford S.R. Works. The locomotive types proposed for standardisation include streamlined high-speed "Pacifics" with 6 ft. 8 in. driving wheels, and "A2's" for fast mixed traffic having driving wheels 6 in. less in diameter, each with 250 lb. per sq. in. boiler pressure; "B1" class 4-6-0 and "L1" 2-6-4Ts, the last two being two-cylinder designs with 225 lb. per sq. in. boiler pressure that have been illustrated and described in previous issues.

L.M.S. Locomotive Developments

During the four-weekly period ending on 30th November last, new locomotives were placed in service and allocated as follows: class "5" 4-6-0 mixed traffic built at Horwich, No. 4987, 26A (Newton Heath, Manchester); class "4P" 2-6-4Ts, built at Derby, Nos. 2253-5, 2257, 26A; No. 2256, 23A (Bank Hall, Liverpool); No. 2258, 5A (Crewe North). A new class of light 2-6-0 and 2-6-2T engines has been constructed at Crewe. They are described and illustrated in the article on page 50 of this issue.

A very considerable number of the "Royal Scot" 4-6-0s now have the new taper boilers and improved fittings that are becoming standard for the whole class. Rebuilt "Scots" have begun working to and from Manchester via Stoke on passenger expresses, turns for a long while reserved almost entirely for "Patriot" class engines.

Converted "Royal Scot" No. 6133, *"The Green Howards,"* was the centre of an impressive ceremony at Leeds City station in December last. Plaques of the regimental crest have been presented by Sir Robert Ropner, Bt., and fitted adjacent to the nameplates, and these were unveiled by Gen. Sir Harold Franklyn, Colonel of the Regiment. A Guard of Honour paraded and a Hussars Band took part in the ceremony.

For the occasion No. 6133 was in charge of Driver C. Wallace, and his son, Fireman C. Wallace, both of Leeds. The former served with the "Green Howards" throughout the 1914-18 war, being wounded four times; the latter has just been demobilised after long service with the Royal Engineers during the last world war.

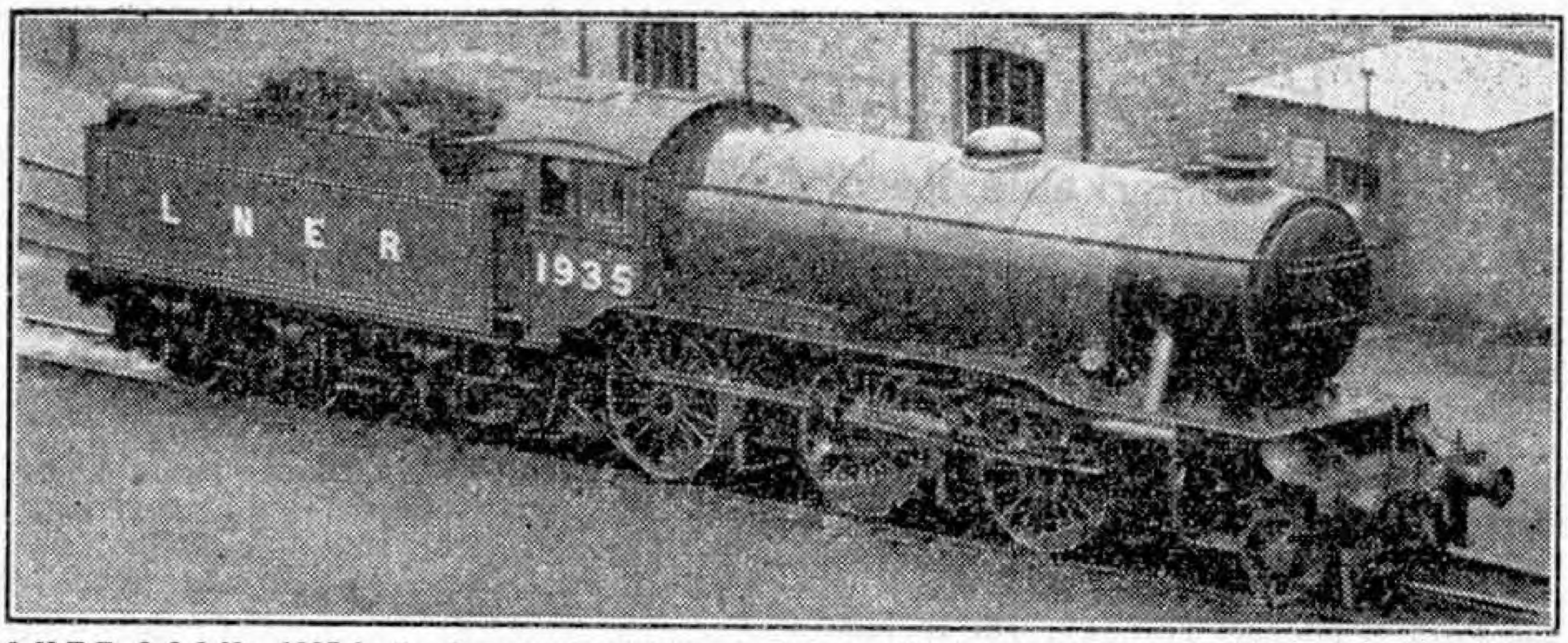
"Patriots" also are appearing with the same tapered boilers as the converted "Royal Scots." An article dealing with these will appear next month.

A Green "K3" Engine

When the first big 3-cylinder 2-6-0s were introduced for the Great Northern Railway in 1920, the pioneer engines in Britain to have boilers of so large a diameter as 6 ft., they were numbered 1000-9 and painted green. All the 183 subsequent representatives of this powerful class built by the L.N.E.R. have been black, so that No. 1935, new number, which we illustrate this month, is the first "K3" to boast an apple-green livery, the forerunner we hope of many other locomotives of this and other types that will brighten the L.N.E.R. scene with their new colour schemes.

Great Northern Compound 4-4-0s

One of our illustrations this month depicts one of the five "V" class 4-4-0 3-cyl. compound express engines of the Great Northern of Ireland, which carry numbers 83-7 and are named after large birds. They have some affinity with the S.R. "Schools" on account of wheel and cylinder arrangement, and also classification and size, though their method of steam distribution reminds us of the L.M.S. (Midland type) compounds.



L.N.E.R. 2-6-0 No. 1935 in the Company's post-war apple-green livery, with black and white lining. Photograph by courtesy of the L.N.E.R.

Repair Work to Tunnels and Bridges

The Severn Tunnel on the G.W.R., the longest in the British Isles and one of the longest underwater tunnels in the world, has been closed to traffic and in the possession of the Engineering Dept. every Sunday for some months. Between about 6.0 a.m. and 5.0 p.m. traffic has been diverted over the Severn Bridge, near Sharpness, or by the longer route through Gloucester. About 2½–3 miles of track in the tunnel on one line or the other are renewed each winter. Diesel locomotives, pulling an inspection wagon from which tunnel walls are examined, form part of the repair equipment, which has to be stored on a large scale near the mouths of the tunnel.

Woodhead Tunnel, the longest on the L.N.E.R. and recently illustrated and described, also has been the scene of large-scale repair and renewal work, necessitating single-line working as well as the diversion of many trains on weekdays. The shorter Thurgoland Tunnel, further along the same hilly Manchester-Sheffield line, would not provide sufficient clearance for overhead electrical gear about to be installed, so a new bore is to be constructed alongside the present tunnel; traffic eventually will pass one way through the new tunnel and in the opposite direction through the old one, which will become a single, instead of a double, line bore.

Parts of the steel decking of the Forth Bridge in Scotland are being renewed, and a number of shorter bridges over roads or other railways are in course of major repair or replacement. As much as possible of the steel or timberwork is prepared to fit exactly beforehand, as it is often practicable to stop all trains only during the night or at the most between Saturday night and Monday morning.

British-Built Royal Train for South Africa

A magnificent British-built Royal Train will be the mobile home of the King and Queen, the Princesses, staff and officials during their tour of South Africa this spring. Eight fine cars were completed and furnished ready for shipment within nine months at the Birmingham Works of the Metropolitan-Cammell Carriage and Wagon Co. Ltd. Four more are following for the use of Union Ministers. The complete train will comprise 14 coaches, including a lounge car, dining, sleeping and kitchen cars, and baggage van, of the type used on the luxurious South African "Blue Train." The new cars are built of steel and are fully air conditioned, and although designed for running on the 3 ft. 6 in. gauge are over 8 ft. in overall width and 65½ ft. long. Accommodation includes Royal staterooms, the King's study, bathrooms with showers, and secretaries' offices. Telephones and broadcasting and wireless receiving apparatus also are installed.

A pilot train formed of South African corridor restaurant sleeping and lounge car stock, conveying Press representatives, police, officials and guests will run ahead, and will be in wireless telephonic communication with the Royal Train.

L.M.S. "Pacific" No. 6223 "Princess Alice," with streamlining removed, working on the right-hand line at Brock Troughs north of Preston on a Sunday Glasgow-Euston express. Wrong line working is carried out when relaying or other engineering work makes it necessary. Photograph by W. S. Garth, Preston.

Great Western Tidings

The G.W.R. are hoping to turn out five new coaches a week, many of which will be of the new standard corridor type provided with big observation windows and fluorescent lighting. The new or refurnished dining cars have comfortable seats, large mirrors, recessed lighting and improved ventilation. Plans for 1947 include also the construction of 110 new locomotives at Swindon, the relaying of 370 miles of track, and considerable repainting of bridges, stations and depots using new shades of chocolate and cream.

New 0-6-0 goods engines numbered 3200-9 are in service.

Parsons Turbo-Alternators

A Remarkable Record of Power Production

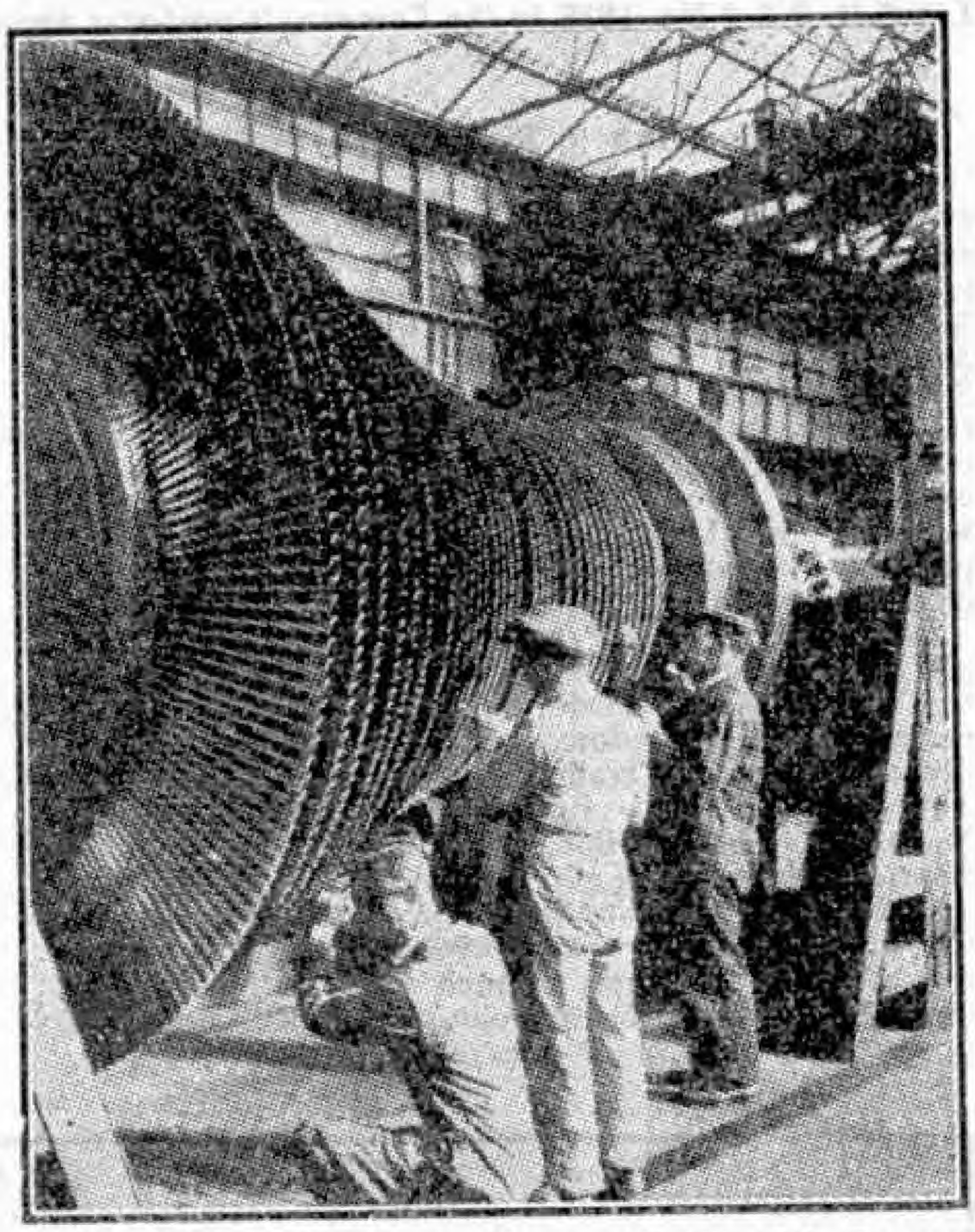
IT is difficult to estimate the enormous value of electricity to us to-day. Every workman appreciates the electric motor that drives his lathe, mill or drill. We use electric motors for working elevators in shops and hotels, for driving trams, trolley buses and electric trains. In the home electricity is used for lighting, cooking, heating, radio and many other purposes.

To what do we owe all this? First to the work of Michael Faraday, who in 1831 introduced the dynamo. Other inventors were soon contributing to its development, and in a short time civilisation had at its disposal electric power capable of being employed as heat, light or mechanical energy. These dynamos required some form of prime mover to drive them. They were high-speed machines, and in the early days of electric power stations the only available prime mover was the slow-speed steam engine, so that dynamos had to be driven by means of ropes or belts. Thus there came a demand for a high-speed engine for driving the fast-running dynamos. This demand was met for a time by several high-speed reciprocating steam engines—the Brotherhood, the Willans, the Bellis and others; but in 1884 Parsons brought out his compound "Reaction" steam turbine, which was destined to revolutionise power station practice.

The first Parsons turbo-dynamo was a multi-stage machine developing 7½ kW. when running at a speed of 18,000 r.p.m. Its invention marked the beginning of a revolution in power production which was destined to spread throughout the whole of the world. It required much persistence on the part of Parsons before his turbo-generators were able to enter their proper field of central station work, and by 1888 only about 200 machines were in service, being employed almost exclusively for ship lighting duties.

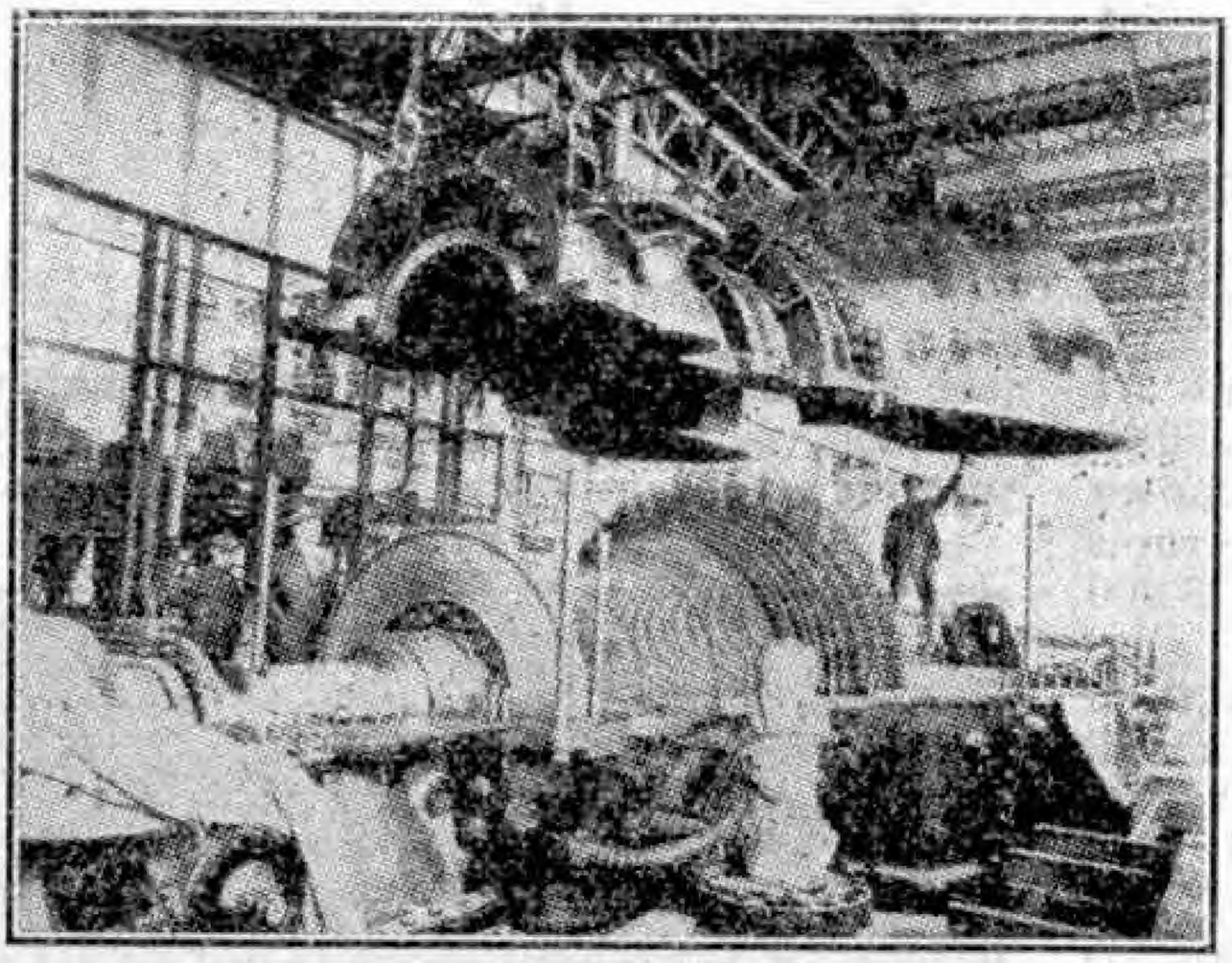
Realising the possibiliites of the new type of prime mover, and in order to develop it to its fullest extent, Parsons in 1889 founded the firm of C. A. Parsons and Co. Ltd., and established a small works at Heaton on a site about two miles from the centre of Newcastle-upon-Tyne.

The Parsons turbine in its simplest form consists of a revolving rotor on which are mounted a number of rows of blades, and a stator or stationary cylinder also containing an equal number of rows of blades. The steam expands first in the stationary blades or nozzles, attaining an increased velocity, which is discharged on to the moving blades thereby causing the latter to revolve. The blades mounted on the rotor are similar to the stationary blades so that the steam is further expanded with an increase in the velocity.



Blading the L.P. spindle for a 50,000 kW. Parsons Turbine. Photographs by courtesy of C. A. Parsons and Co. Ltd.

This increased velocity as it leaves the moving blades gives them additional momentum, hence the term "Reaction" turbine. This process of speeding up the spent steam over and over again by repeated small pressure drops is continued in each row until the steam pressure has gradually fallen from the original boiler pressure down to the condenser vacuum into which the steam finally exhausts. In this way the Parsons turbine in reality consists of a number of simple turbines all mounted on a common shaft and all helping to urge it round. The machine is thus a compound steam turbine, and com-



A 50,000 kW. Parsons Turbo-Alternator under erection.

pounding is the one essential feature of all modern turbines as constructed for high economy.

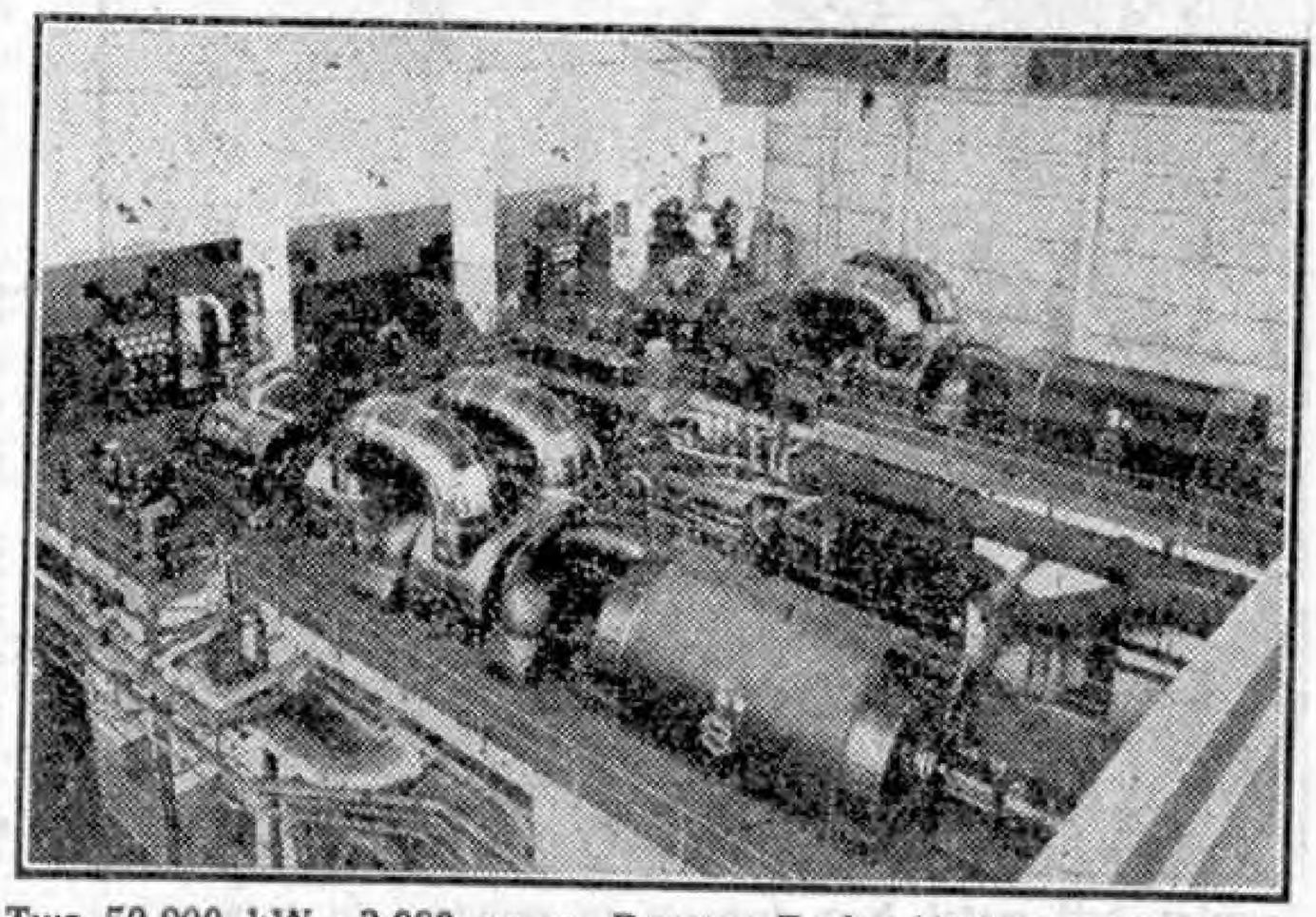
This month's cover picture shows the 96-ton stator for a Parsons 33,000-volt turbo alternator being unloaded from the freighter *"City of Barcelona"* at Table Bay Harbour, South Africa.

The first power station in the world to employ turbo-generating plant was the Forth Banks power station at Newcastle. This station went into commission in January 1890 with an initial equipment of two 75 kW. Parsons turbo-alternators. Other public lighting companies quickly followed this lead, and turbo-alternators were installed at Cambridge and Scarborough. The Cambridge station went into commission on 18th November 1892, with three 2,000 volt single phase Parsons turbo-alternators each with a rated capacity of 100 kW. at 4,800 r.p.m. These machines were the first turbine units to be operated with condensers, and tests showed their efficiency to be comparable with that of reciprocating sets of equal power. The first turbine unit to be installed in any municipal power station was a Parsons turbo-alternator of 150 kW. at 3,000 r.p.m. supplied to the Corporation of Portsmouth in 1893.

It had been recognised from the first that larger units would give greater steam economy, and this prediction was confirmed by tests made on some 350 kW. turbo-alternators installed in 1894 in the Manchester Square power station, London, and later by the performance of two 1,000 kW. turbo-alternators constructed for the Eberfeld power station, Germany, in 1900. The size of turbo-alternators gradually increased, and in 1912, a 25,000 kW. set was installed in the Fisk Street power station, Chicago, U.S.A. This machine at the time was the largest turbo-alternator in the world, and broke all records for steam consumption. With the intervention of the 1914-18 war little time was available for development and research work, but in 1923 the first 50,000 kW. turbo-alternator to be constructed in Great Britain was completed at Heaton Works and supplied to the Crawford Avenue power station, Chicago.

Along with the increase in size of machines, the running speeds have increased. The earlier large sets operated at 1,500 r.p.m., while to-day turbo-alternators of 50,000 kW. capacity are operating at 3,000 r.p.m.

Equally important developments have taken place on the electrical side of the plant. Alternators in the early days were of the single phase type and generated generally at about 6,600 volts. In 1900 the first three phase turbo-alternators were constructed at Heaton Works, and in 1905 the first machine to generate at 11,000 volts was built for the Kent Electric Power Co. By 1928 (Continued on page 94)



Two 50,000 kW., 3,000 r.p.m. Parsons Turbo-Alternators installed in Bunnerong power station, Australia.

The Birth of a Bell

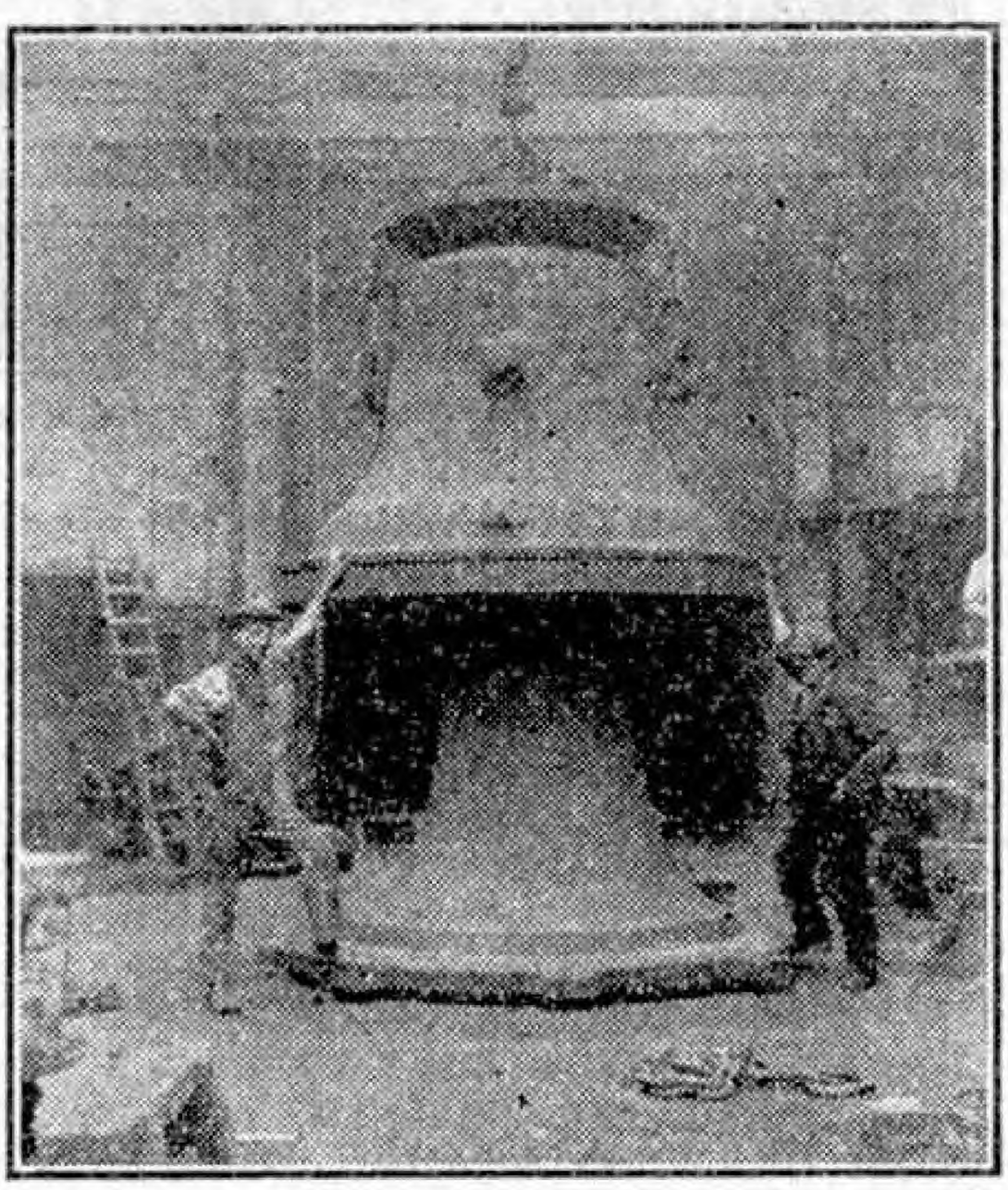
From Foundry to Tower

By Ernest Morris, F.R.Hist.S., F.R.G.S.

THE making of bells is an ancient art that probably goes back to the earliest days of metal craft. The oldest known bell in the world, discovered near the ruins of Babylon, is reputed to be over 3,000 years old.

In England bell-founding was practised 1,000 years ago, and the shape of a bell has changed but little during the centuries, the conventional form being still considered the best for quality of tone. The historical aspect of bell-founding abounds with interest. In England the art, as many others, had its inception in the church, and was fostered by it. The first bell-founders were undoubtedly monks, but in due course bell-founding became a regular profession.

If you go to one of the few foundries now making bells, you see an inspiring yet strange sight. In one department are moulds, cores and frames of all sizes in varying stages of completion. In another there are sundry bells, more or less finished and weighing anything from a few pounds to several tons. They are destined for docks, churches, town halls and other structures in all parts of the world, where they are attached to clocks, carillons, or peals. You see frames set up exactly as they will be built into the towers destined to receive them, for no set of bells, whether small peal or mighty carillon, is allowed to leave the foundry until every detail is carried through and

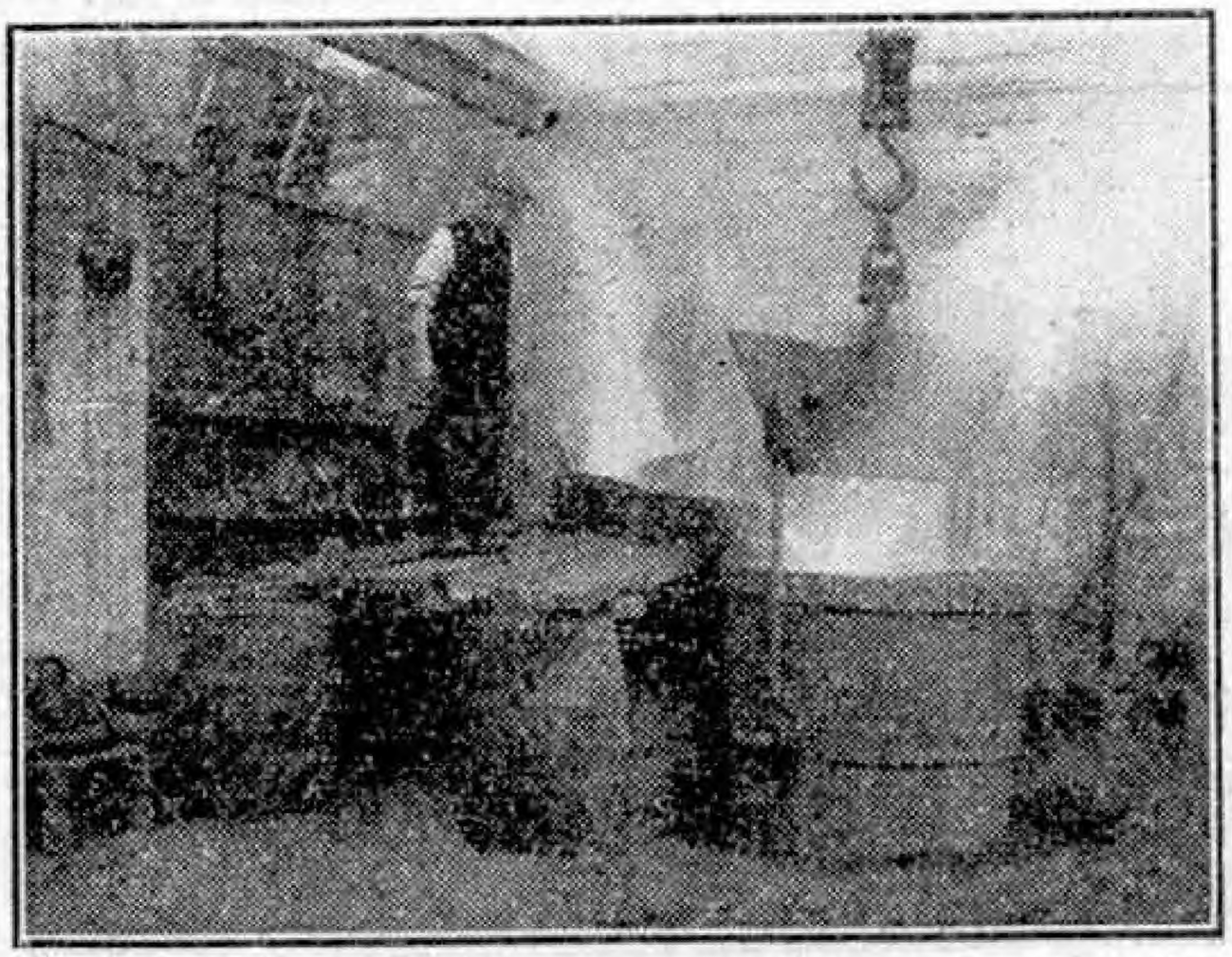


Cope and core, two parts of the mould for a bell.

made as complete as it will be when installed ready for use.

Bells must be constructed with great care. The metal used is a special alloy consisting for the most part of copper and tin in proportions varying according to the size and tone required. This alloy assures good musical tone and also is resistant to the continued blows of the bell's clapper. The shape of the bells too is of utmost importance, as they have to be used in harmonic sequence.

When a bell is about to be cast, the inner mould or "core," as it is called, is first built up on a strong iron plate. The material used for building up is bricks jointed with moulding sand, ground wet and mixed with other materials, and the surface of the core coated with the same material. The shaping of the



Teeming bell metal from furnace to cauldron in preparation for casting.

core is effected by a strickle template or crook, as it is variously designated, modelled so that its inner shape has the exact inner form of the bell. This template swings round on a pivot in the centre of the base plate, and by this means the moulder is able to build up the core. Next, the "cope" or cover is made, again with the aid of a swinging template cut to the exact size and shape of the outside of the bell. With this the moulder lines an iron case or box with loam, until the outer form of the bell is fashioned. Core and cope are then finished by hand and thoroughly dried in a stove constructed specially for the purpose. Finally the cope is placed over the core, the greatest care being taken that the two are concentric; they are firmly clamped together and thus form what is termed the mould for the bell.

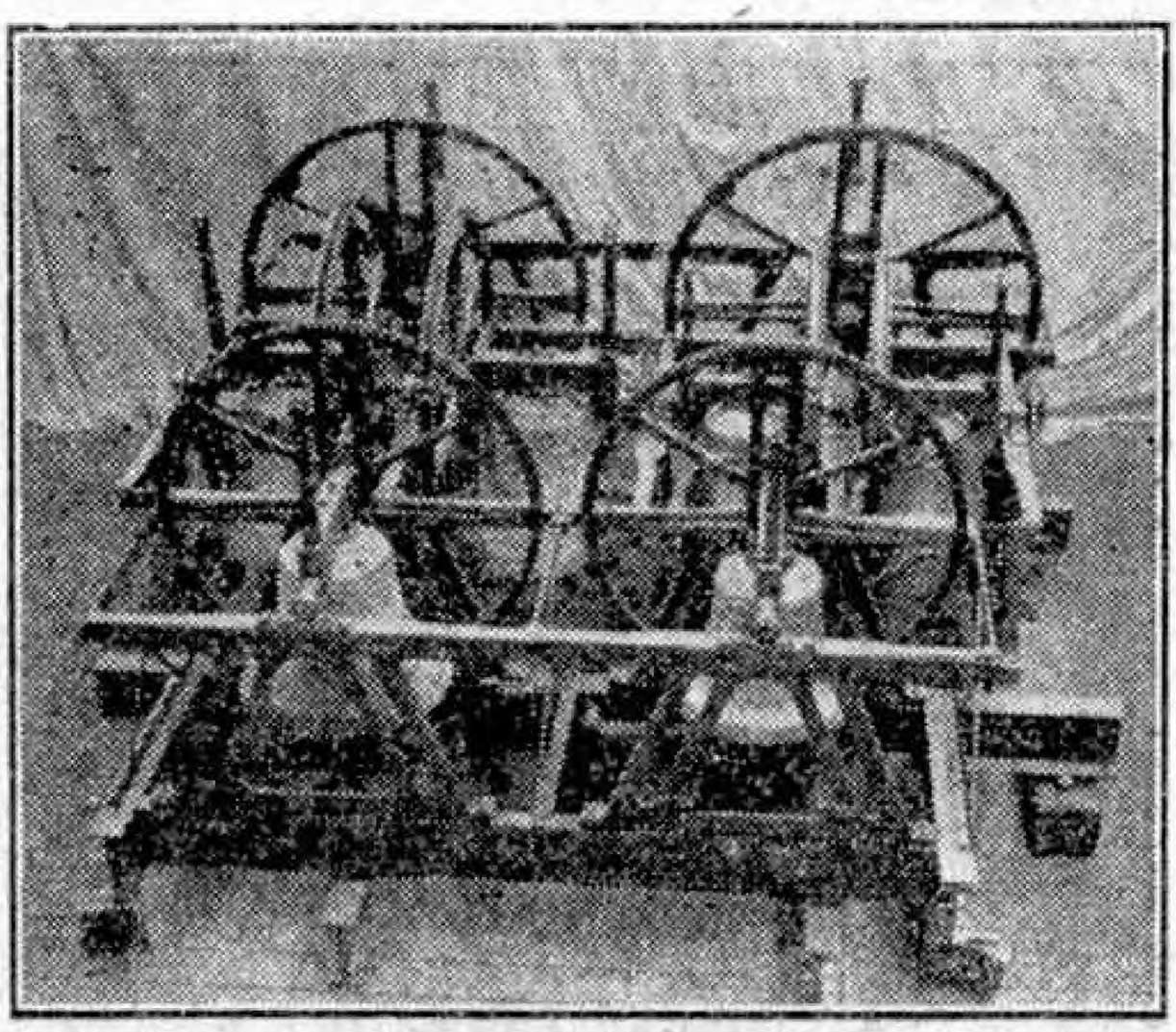
The bell metal is melted in specially designed furnaces, and is tapped out into a ladle similar to that used by ironfounders, care being taken to run the metal at the proper temperature. The time allowed for the cooling off of the metal after the bell is cast varies according to the size of the bell. Smaller ones are removed from the moulds the day after being cast, but the larger ones have to be left a longer time.

After being thus cast, a bell is trimmed, cleaned by sand blasting, and drilled. It is then taken to the tuning machine, which is a kind of vertical lathe, and the principal notes and its harmonics are adjusted by the removal of small portions of metal in certain places. A true bell must be "in tune with itself." This means that in addition to its principal or "strike" note it should give certain harmonics. These are the nominal, which is an octave above the strike-note, the hum note, which is an octave below, the tierce or third, and the quint or fifth.

When tuned a bell is ready for its fittings. If it is intended for a "swinging peal" in the English fashion, it is provided with a headstock having a wheel on one side, and a "stay" on the other, and in these days all such bells swing on ball-bearings. The frames are mostly of iron and steel, so constructed that when all the bells are in full revolution, the strain and stress on the tower is reduced to a minimum. Thus while some bells swing east to west, others swing west to east; similarly those swinging north to south are balanced by others swinging in the opposite direction. This is done to minimise the effect of the thrust and sway of the many tons of metal of which a peal may consist.

If the bells are intended for a carillon, then they simply hang dead, that is they do not swing but are clamped to the carrying girders, and the bells are sounded by swinging the clappers to them by means of wires and levers. A carillon is a set of bells tuned to the chromatic scale upon which music in two or more parts can be played, that is, airs with accompaniment, and consists of 25 bells or more. (*Continued on page 94*)

A bell on the tuning machine.



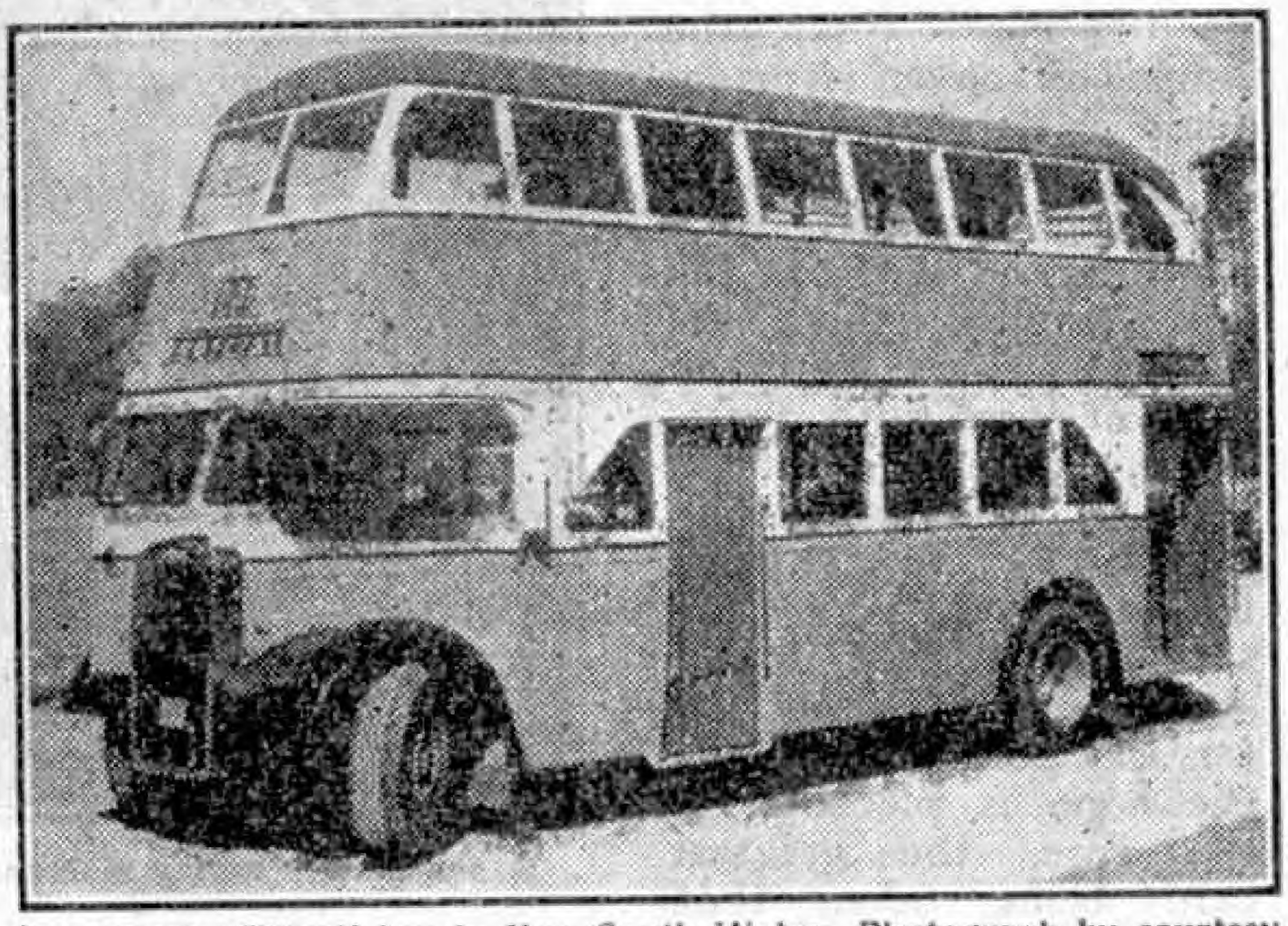
A typical steel and iron bell frame. The illustrations to this article are reproduced by courtesy of J. Taylor and Co., Loughborough.

On the Road

Leyland "Titans" in Australia

This month we illustrate a Leyland "Titan" bus recently delivered to the New South Wales Road Transport Board, Australia. It is equipped with a 59-seater Australian-built body, painted green and cream, superseding the previous red colour scheme. An interesting feature is the forward entrance, which has a light metal concertina type door. This additional entrance greatly increases the loading efficiency of the bus and is very convenient for passengers.

The bus has been placed in service on the Sydney-Coogee Beach route, a popular 5½ mile run with consistently heavy traffic to and from the several beaches. At one point it has a gradient of 1 in 7 for a distance of over a quarter of a mile.



A Leyland "Titan" bus in New South Wales. Photograph by courtesy of Leyland Motors Ltd.

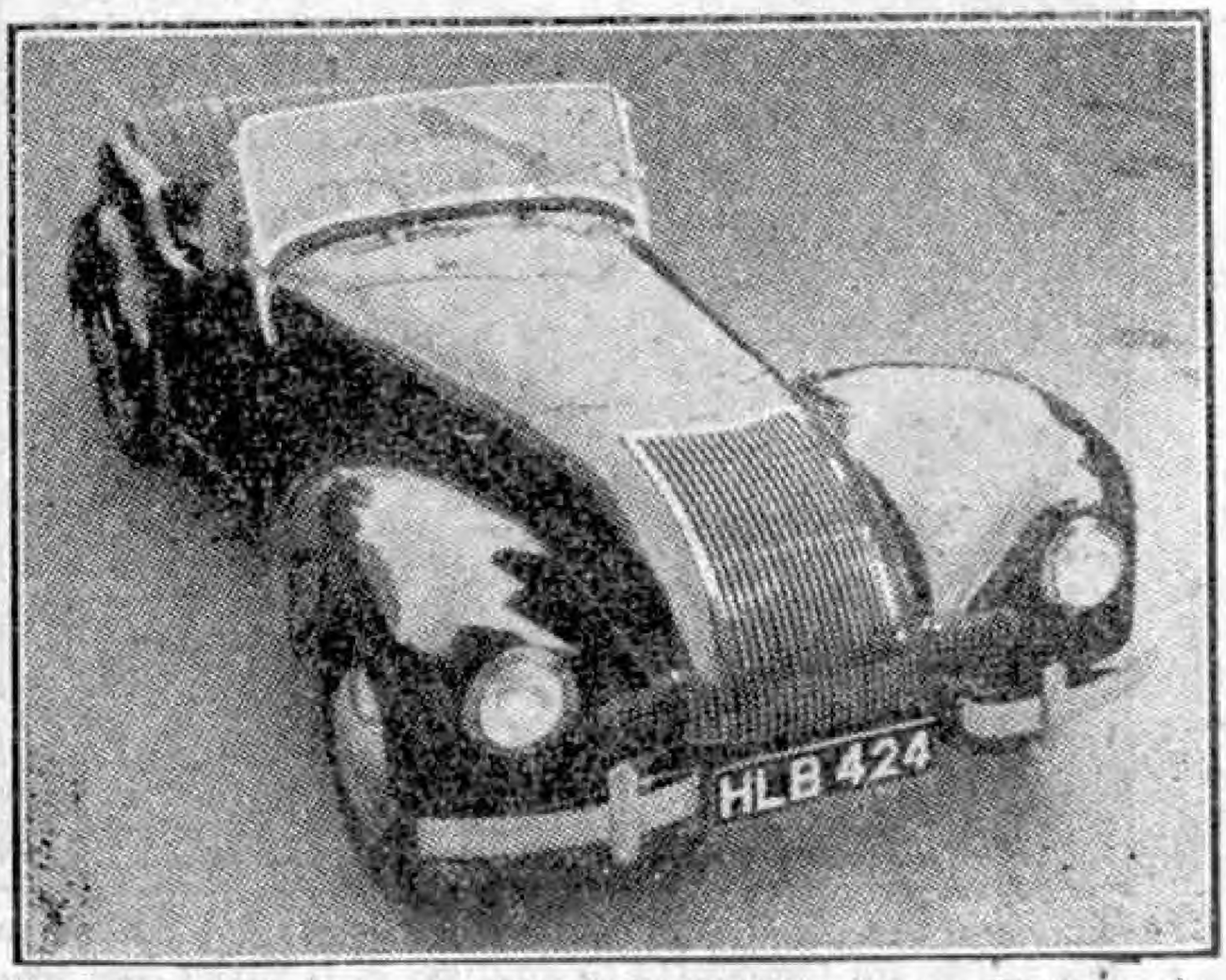
A Dutch Rear Engine Design

A new 1,099 c.c. car known as the P.W.101-A is to be produced by the Micro Metallum Engineering Company of Holland. It weighs only 15¾ cwt. and is designed to carry from four to six people. The engine, which is a four-cylinder horizontally opposed unit, is located at the rear of the car and mounted in such a way that engine changes can be completed within half an hour if necessary. A luggage compartment is provided above the engine and the fuel tank is behind the rear seat just above the axle, while the spare wheel normally carried at the back is situated under the bonnet.

A Successful Sports Car Model

A well-known competition model of pre-war days was the Allard, which had a fine series of successes from 1936–1939, including sports car records for the Prescott and Wetherby hill climbs, and best performances four years running in the Scottish Sporting Car Club Highland two-day trial and other similar events. Since the end of the war more wins have been recorded by this make in speed trials and hill climbs, not only in this country, but also abroad, in the Ostend Concours d'Elegance, at which a Grand Prix award and a special cup were secured.

The Allard car has installed in it a 30 h.p. Ford V8 engine, together with other chassis components of Ford manufacture. Three models are now available. One of these is a two-seater competition model, the chassis of which has a short wheelbase of 8 ft. 10 in. The other two are the Coupé and the open sports models, both of which are four-seaters and have a chassis with a wheelbase of 9 ft. 4 in. A further model in the form of a four-seater saloon on the longer wheelbase chassis is to make its appearance soon.



The sleek and attractive Allard four-seater tourer. Photograph by courtesy of Allard Motor Co. Ltd.

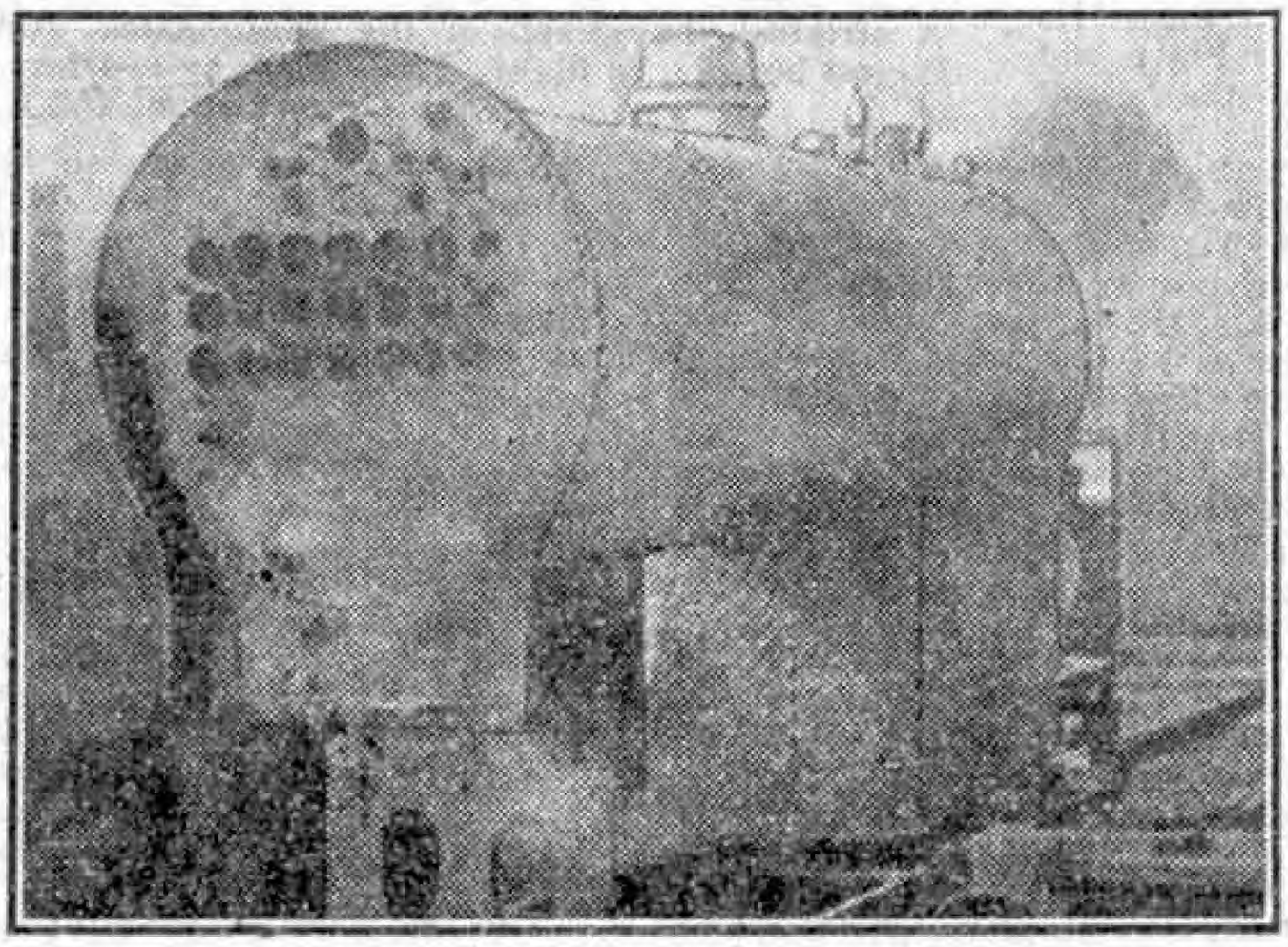
Have You Ever Thought About This?

How are Locomotive Boilers Tested?

By "Shed Superintendent"

IN the early days of railways, the possibility of a boiler explosion on the "fearsome steam monsters" was looked upon as a grave risk. A hundred years later we may be amused at this, for railway history records very few cases of that kind.

Regulation tests are carried out on boilers, in the workshops. Every time the engine receives a general repair, the boiler is given a hydraulic test and a steam test. The hydraulic test is carried out by pumping water into the boiler, filling it completely, and raising the pressure to one-and-a-half times the working pressure. This is perfectly safe, because water is practically incompressible; in other words, it is inelastic, and should any seam, joint or rivet give way during the tests, the leak would immediately release the pressure. The fluid, water, is merely a means of distributing an internal load on the boiler. Steam is bottled-up energy and behaves very differently.



A locomotive boiler under steam test.

After the hydraulic test, the steam test is carried out at working pressure, this test being for steam-tightness and not for strength. The steam test is carried out before the boiler is mounted on the engine frames. The bare boiler, without its protective clothing or lagging, looks very odd, as will be seen from the illustration. There is no smoke-box fitted at this stage, and the smoke can be seen coming out of the tubes at the front end. During the steam test, small leaks are caulked and the safety valves are set.

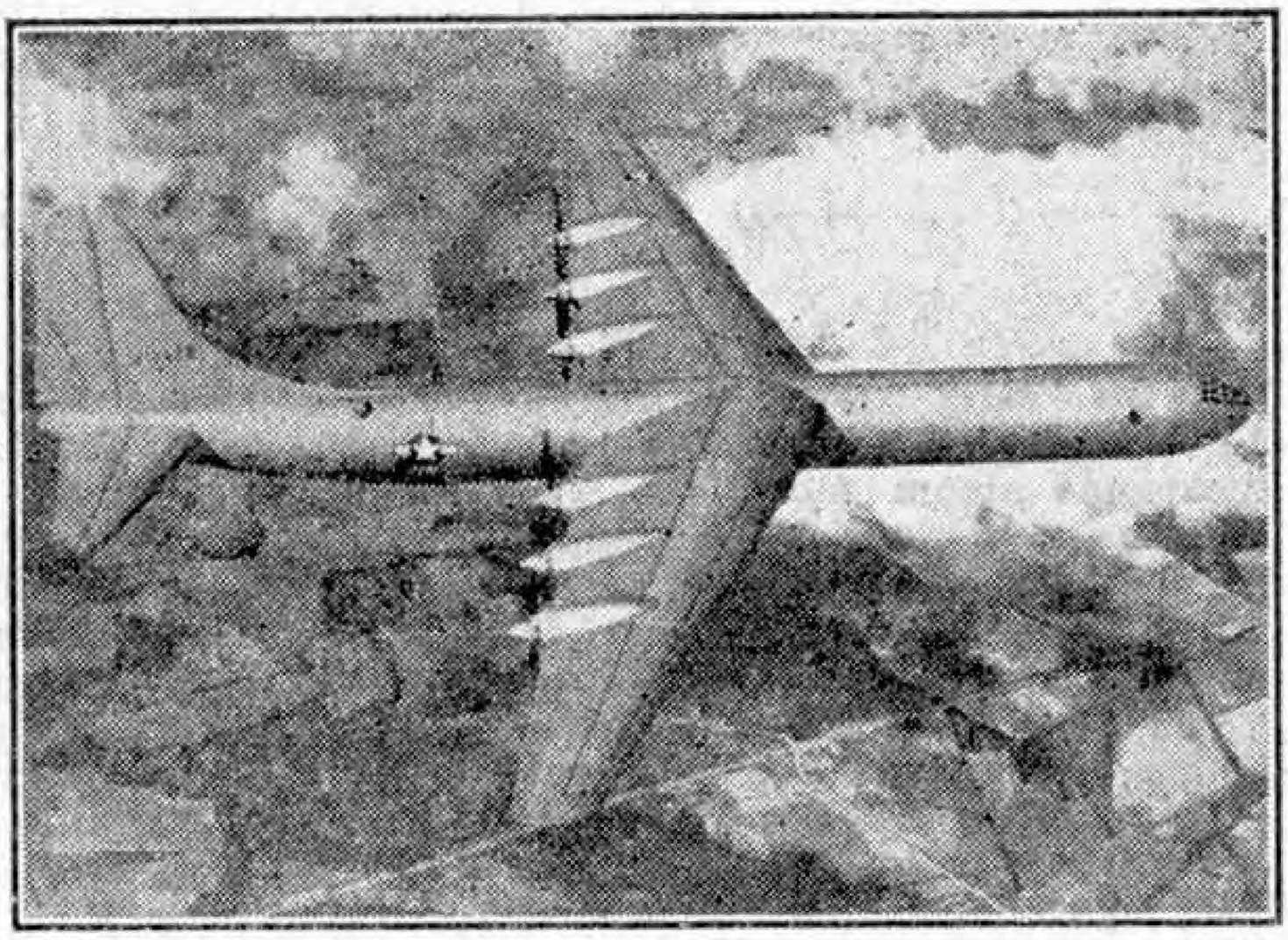
The boiler is then put on the engine, which proceeds into service. In the running shed every boiler is examined by a competent boilersmith at fortnightly intervals. He does not, of course, examine it all over, as much of it is covered and the covered portions do not give trouble which would justify frequent examination. The boilersmith concentrates on those parts of the boiler which are liable to deterioration. He examines the fire-box, by climbing in through the firehole and hammering the plates and stay heads to see if they are sound. He looks for signs of tube leakage and, if necessary, has some tubes removed for measurement of their thickness.

He then examines the water spaces through the inspection plug holes on the outside of the boiler. He uses a small mirror, and a lamp on the end of a long rod. This lamp is passed into the boiler through one of the holes other than the one being used for observation. It is not possible to see all the interior surfaces of the boiler, obviously, but the plugs are so placed as to give access to parts which require regular scrutiny. The amount of scale in the waterways can be seen, and a check made on the work of the boiler washing staff.

After the examination is complete, all the plugs are carefully screwed up one by one, until the last two upper holes are reached. Through one of these the boiler is filled with water, the other letting the air pass out as the water passes in. All the plugs are screwed up to a steamtight fit, and the boiler can then be put in steam again for the next duty.

Every three or four months a District Boiler Inspector makes his own examination, and no major repairs are made without his consent or recommendation.

Air News



A striking photograph of the Consolidated Vultee B-36, the world's largest bomber, in flight. Photograph by courtesy of Consolidated Vultee Aircraft Corporation, U.S.A.

More News of the World's Largest Bomber

The new 6-engined Consolidated Vultee B-36 heavy bomber, mentioned in the September 1946 "*Air News*," has successfully completed its flight tests. One of the first photographs of this huge machine in flight is reproduced on this page. The B-36 is described as being "capable of carrying an atomic bomb to any inhabited region in the world and returning home without refuelling." It is certainly formidable, for it has a normal range of 10,000 miles with five tons of bombs and can carry over 30 tons of bombs for a short distance.

The B-36 has a span of 230 ft. and weighs nearly 125 tons. Its six 3,000 h.p. 28-cyl. Pratt and Whitney engines drive the largest propellers ever fitted to an aeroplane—19 ft. dia. Curtiss electric with hollow steel blades—and give it a top speed of over 300 m.p.h. The fuel tanks hold 21,116 gall. of petrol, enough to last an average motorist more than 20 years! The metal tunnel connecting the pressurised front and rear crew departments is so long that a 4-wheeled scooter is provided to convey the crew from one end to the other. The prototype B-36 has two massive 110 in. main landing wheels, but production machines will have eight 56 in. wheels arranged in 4-wheeled "trucks" on each side like those of the new Lockheed "Constitution." J.W.R.T.

An American Reconnaissance Seaplane

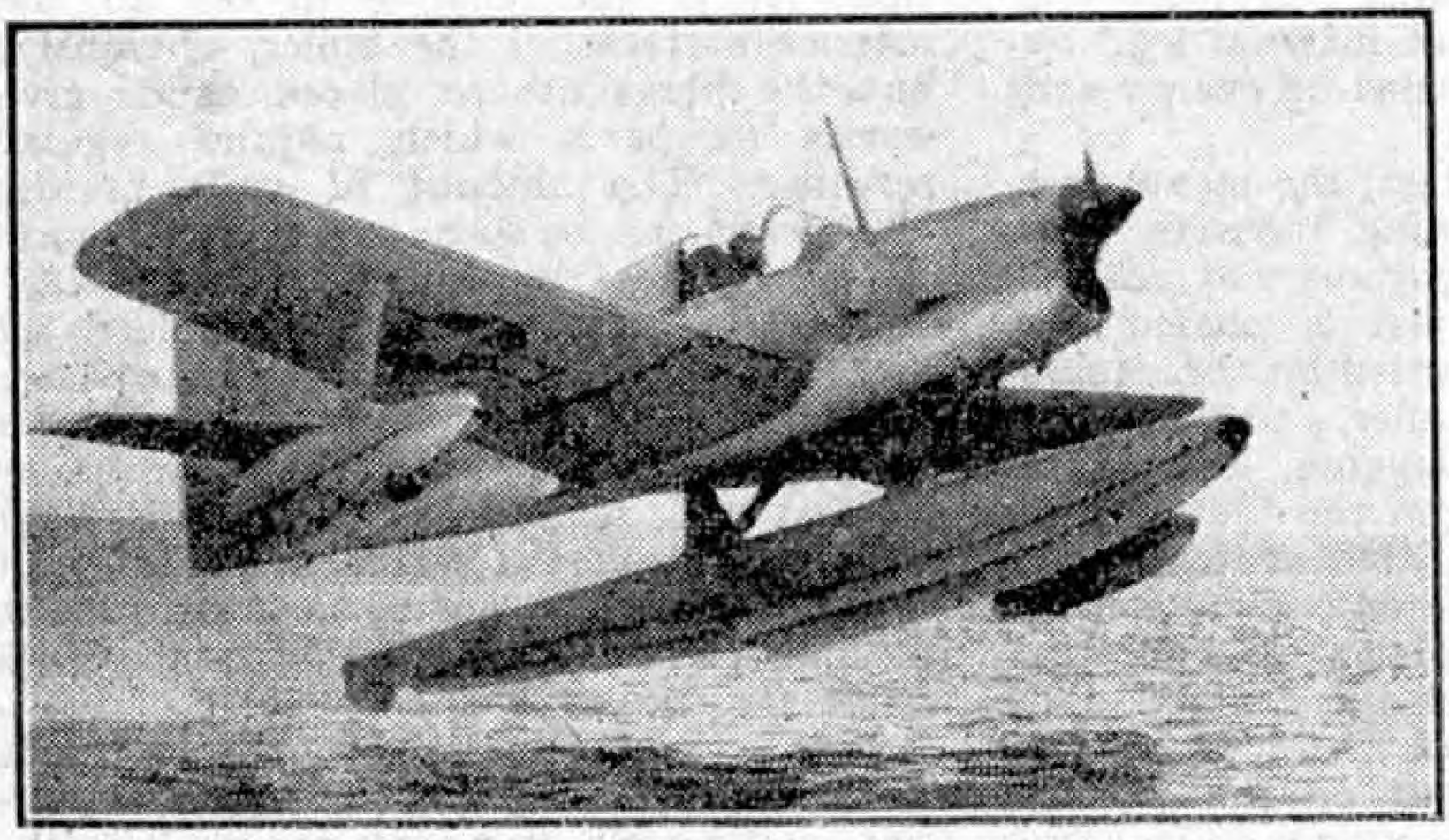
For some 20 years the Edo Aircraft Corporation of America have been making seaplane floats for all types of aircraft from tiny Piper "Cubs" to "Dakotas." Now, "starting from the floats and working upwards," they have designed and built their first complete naval aeroplane, the XOSE-1 illustrated on this page. It is a neat little reconnaissance seaplane, powered by a single 550 h.p. Ranger air-cooled in-line engine.

Wartime experience with the well-known "Sea-mew" and "Kingfisher" seaplanes proved that aircraft intended for catapult-launched operation from battleships and cruisers have to be sturdy to withstand launchings and rough sea landings. They also have to be light for maximum manœuvrability and ease of handling in restricted space, and compact to facilitate stowage aboard ship. The XOSE provides an admirable answer to these requirements, combining them with good flying characteristics. Basically it is a single-seat low wing monoplane with one main float and two wing-tip floats. Its inverted engine assembly has been designed as a "power egg," attached to the fuselage by four bolts and replaceable in a matter of minutes complete with all its pipes, components and gadgets. The field of vision past the neat cowling is particularly good, an invaluable feature for reconnaissance and air/sea rescue work. The machine weighs only two-thirds as much as the U.S. Navy's present seaplane scouts, and this, combined with a low landing speed, makes possible landings in rough water. The wings fold for stowage aboard ship.

The Edo XOSE-1 has a top speed of over 200 m.p.h., carries full observation equipment, an unspecified defensive armament, and armour plate to protect the pilot, and has provision for carrying depth charges—all this and a range of 1,000 miles! Much of the credit for this fine performance must be given to the use of a new aluminium alloy in its construction which combines great strength with lightness.

A two-seat version is being built under the designation XOSE-2, and this, like XOSE-1, can be fitted with wheels for ferrying purposes.

J.W.R.T.



The Edo XOSE-1 single-seat reconnaissance seaplane taking-off. It has a range of 1,000 miles. Photograph by courtesy of Edo Aircraft Corporation, U.S.A.

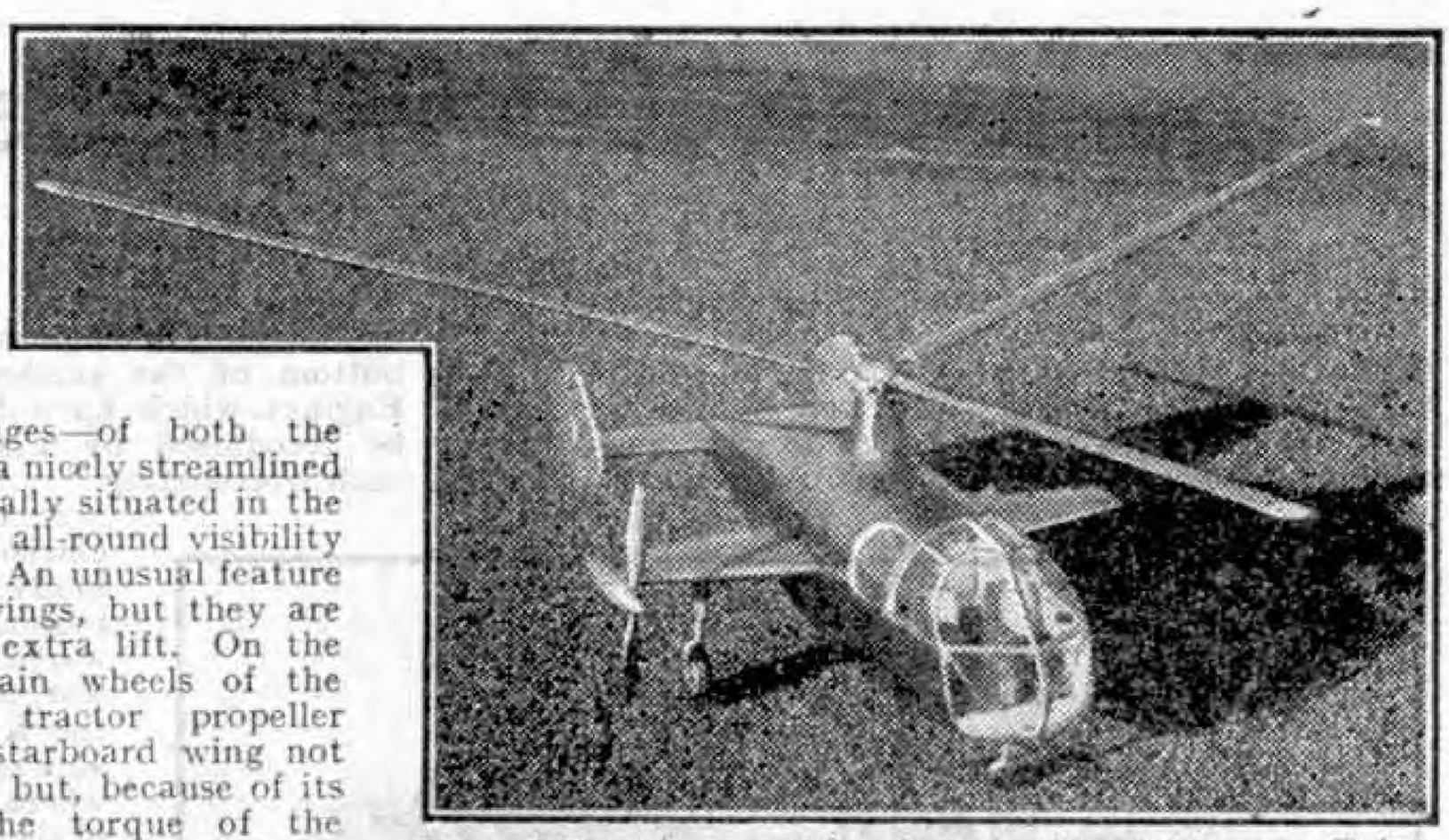
* * * *

The instrument panel from the first Douglas aircraft operated commercially in Australia has been presented to the National Museum in that country. The machine, a DC-2, was retired in September last by its operators, Australian National Airways. In the course of its service it flew a total of 33,000 miles.

The Fairey Gyrodyne

One of the most interesting exhibits at the recent Paris Show was a model of the Fairey FB-1 Gyrodyne, now being built at Hayes. This model is shown in the upper photograph on this page. The FB-1 combines many of the features—and consequently many advantages—of both the helicopter and autogyro. It is a nicely streamlined aircraft with its four seats ideally situated in the fuselage nose, giving excellent all-round visibility through large Perspex panels. An unusual feature is the fitting of short stub wings, but they are not there merely to provide extra lift. On the contrary, they carry the main wheels of the tricycle undercarriage. A tractor propeller mounted at the tip of the starboard wing not only provides forward motion but, because of its position, also counteracts the torque of the large main rotor. This rotor is mounted above the fuselage and its blades are set at a low pitch, which ensures a speedy change to auto-rotation when necessary and so lessens the risk of an accident in the event of engine failure.

The prototype FB-1 will be used for research purposes, but Faireys are already thinking in terms of military and civil production versions. J.W.R.T.



This odd-looking machine is a model of the new Fairey helicopter FB-1 described on this page.

Testing Douglas DC-6 Air Liners Under Service Conditions

Nearly 150 DC-6 air liners have been ordered from the Douglas Aircraft Company, 115 of them by American operators. The largest orders are 50 for American airlines and 35 for United Air Lines. An initial delivery of three DC-6s has been made to each of these companies, who will subject them to at least 60 days' test flying over actual routes and under every conceivable operating condition, before any passengers are carried. This rigorous and unusual flight programme is in addition to the usual certification tests, which have been completed, and will be carried out in co-operation with the Douglas Company and the U.S. Civil Aeronautics Authority.

A Military "Wayfarer"

A special version of the Bristol 170 is being built as a military transport. It will be powered by two Bristol "Hercules" engines. Several alternative loading schemes will be provided—for trucks both with and without trailers, for guns, tractors or bulldozers, or for stretchers and hospital patients, of whom 32 can be carried, with six attendants.

The efficiency of the Bristol 170 has been well proved by Channel Islands Airways' solitary "Wayfarer," which carried over 10,000 passengers and 73,000 lb. of freight some 64,000 miles in its first four months of service—a splendid achievement. J.W.R.T.

Many "Dove" Air Liners Ordered

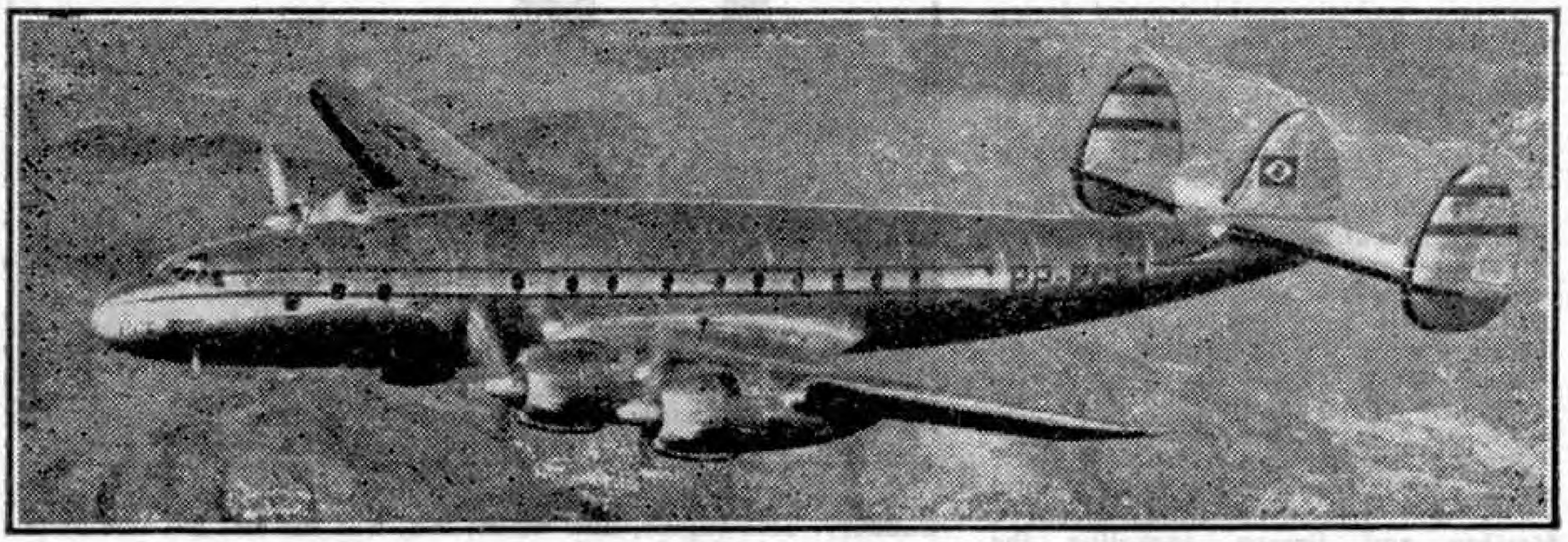
De Havillands announce that orders have been received for 255 of their "Dove" twin-engined air liners. The value of these orders, including spares, is well over £3,500,000, and the majority are for export. "Doves" have, in fact, been sold to 20 countries in all five continents. The latest order is from the Argentine Government and is for 20 machines. These aircraft will be used as feeder-liners linking up with the main Argentine air routes, operated by other British aircraft—Vickers "Vikings." J.W.R.T.

New British Jet Air Liner

Armstrong Whitworth Aircraft Ltd. have received a contract for a new air liner, designed to the Brabazon II B Specification and intended from the outset to be powered by gas-turbine engines. This machine, the A.W.55, is a low wing monoplane, with a circular pressurised fuselage and a tricycle undercarriage. It will have four of the new Armstrong Siddeley "Mamba" propjets, and a range of more than 1,000 miles at a cruising speed of over 300 m.p.h. There will be accommodation for 24 to 30 passengers. J.W.R.T

* * * *

The four Vickers "Vikings" of the King's Flight prepared for Their Majesties' tour of South Africa will use Brooklyn Air Station, near Capetown, as their base. The Flight is under the command of Air Comdre. E. H. Fielden.

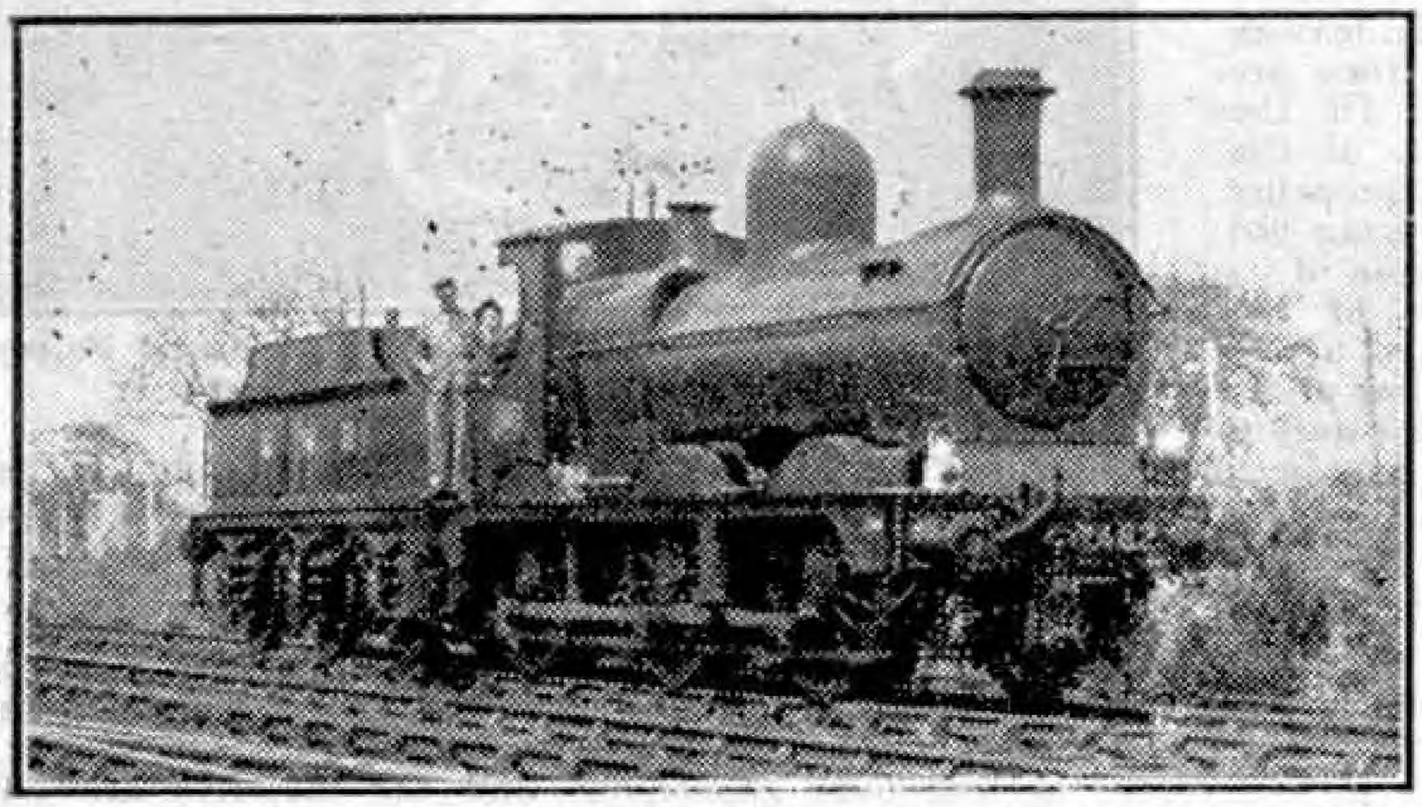


A "Constellation" transport of a Brazilian airline. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

The "Dean" 0-6-0s of the G.W.R.

By D. T. Belton

VETERAN engines that are still performing arduous duties are always fascinating to railway enthusiasts. Such engines are the familiar 0-6-0s of the G.W.R. "2301" class. They were built at Swindon from 1883 onward to the design of William Dean, who was in charge there as Locomotive Superintendent for 25 years. To this day railway enthusiasts affectionately refer to them as "Deans." When their building was finally completed in 1899 the class totalled 280 engines, Nos. 2301-2399, 2400-2499 and 2500-80. The principal features of these engines in their present state include coupled wheels 5 ft. 2 in. in diameter, and cylinders 17½ in. in diameter by 24 in. stroke. The tractive effort, at 85 per cent. boiler pressure, is 18,140 lb. The cylinders are placed inside the frames and the boiler working pressure is 180 lb. per sq. in.



G.W.R. "Dean" 0-6-0 No. 2482 on a trial run after overhaul at Wolverhampton. This is typical of the inside framed engines. The photographs to this article are by D. A. Tipper.

Engines Nos. 2361-2380, built in 1885-6, differed from the others in having a piston stroke of 26 in. and massive double frames, with outside cranks for the coupling rods. They formed part of an experiment in standardisation, which also included embraced engines of 0-6-0T, 2-4-0 and 2-4-0T types, all of which had interchangeable driving wheels, cylinders and boilers.

The continuation of the heavy-looking construction of the double-framed 0-6-0s does not seem to have been considered necessary, and the inside-framed design was used for the succeeding engines. Only one double-framed engine still remains at work at the moment of writing. This is No. 2362, stationed at Oswestry, for working passenger trains on the old Cambrian section.

Nearly 60 engines of the inside-framed type still remain at work, allocated over the greater part of the G.W.R. system, excepting Devon and Cornwall. Many of them are relegated to local goods trains and shunting duties; but on sections which are not strong enough to take heavier engines, they regularly work the bulk of the traffic.

Among the hardest-worked are those stationed at Brecon. They have to haul goods and passenger trains between Merthyr and Brecon, including the ascent of the Tal-y-bont Incline, the gradient for the most part being 1 in 37. Going up the incline the engines are worked so hard that the bottom of the smoke-box door becomes red hot. Engines which have been on this duty can easily be recognised by the rusty patch resulting from such overheating.

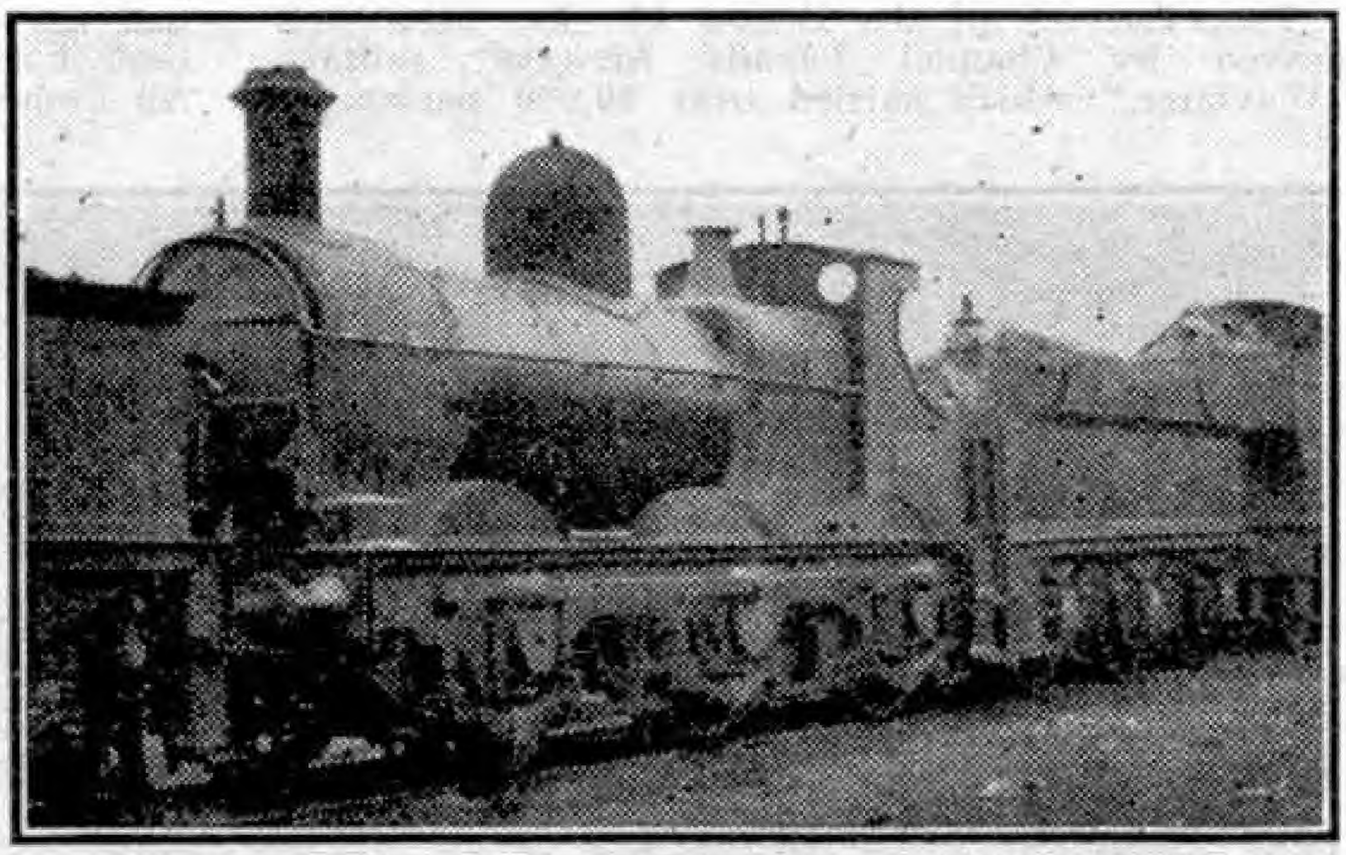
A tribute to the simplicity and efficiency of these engines is that many of them have twice been requisitioned by the Government for wartime service. In the 1914-18 war, 95 "Deans" were taken over by the Railway Operating Department, and saw service in France and elsewhere. At the end of that war most of them were returned to the G.W.R., though there were some casualties.

When the 1939-45 war broke out, 108 engines were taken over by the War Department, and once again saw service on the "lines behind the lines," in France as well as in Algiers and other theatres of war. Many of these engines were lost with the fall of France, but quite a few have returned to this country, and are still in W.D. service. So far none have gone back to their pre-1939 owners. Engines that were captured on the Continent by the enemy seem to have travelled far. One hears reports of them, in various stages of use and disuse, from all over Western Europe.

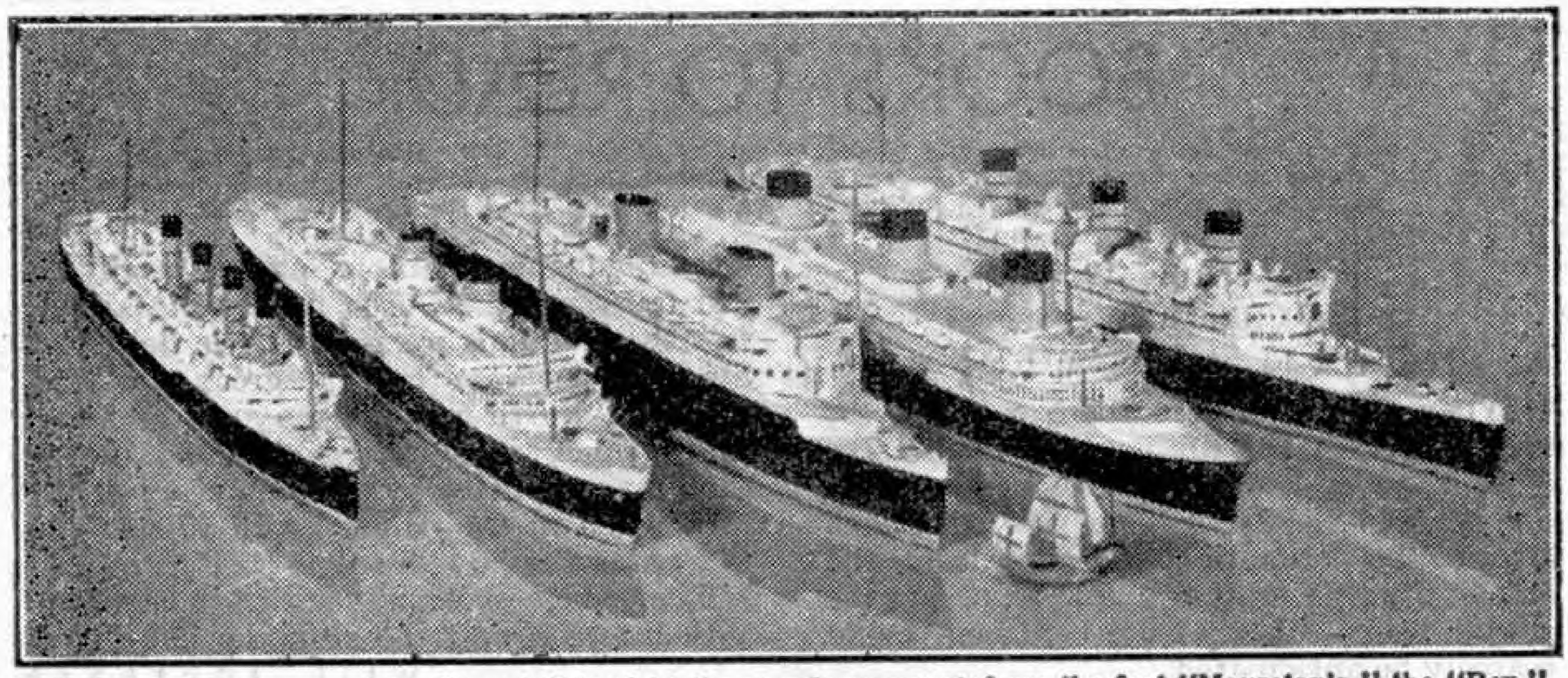
A typical railway on which these engines are still serving the W.D. is the old Shropshire and Montgomeryshire Light Railway, which runs north-west from Shrewsbury to Llanymynech. This line was taken over by the Government during the late war.

It should be noted that between 1907 and 1910 twenty engines, Nos. 2491-2510, were rebuilt as 2-6-2 tanks with inside cylinders. These then became Nos. 3901-20; all have been scrapped.

As well as these rebuilt engines and the ones which have gone to the W.D., some of the "Deans" have been withdrawn from service, worn out with long use; but others have recently undergone a heavy overhaul, for the "Deans" are still required on certain routes where modern 0-6-0s are not allowed.



One of the sturdy outside-framed "Dean" 0-6-0s No. 2379 at Banbury. This engine, now withdrawn, was the last but one of the outside-framed series to remain in service.



A group of water-line models. From left to right the vessels represented are the first "Mauretania," the "Rex," the "Bremen," the "Normandie" and the "Queen Mary." In the foreground is a model of the "Santa Maria" to the same scale. All the models were made by Bassett-Lowke Ltd.

Ships and Men

A Fascinating Story of the Sea

SHIPS and the men who have sailed them never fail to arouse deep interest, provided the story is well told, with real and accurate knowledge of the subject. There is no doubt that Mr. W. J. Bassett-Lowke and his colleague Mr. George Holland possess this knowledge, and they have drawn upon it freely and interestingly for our benefit in "*Ships and Men*."* Probably the story has never been better told, for this is no mere catalogue of the vessels in which man has ventured on rivers, lakes and seas from the earliest times right down to the present.

The reader feels the fresh outlook and the bracing style of the book from the first pages, which picture for us what is known of the origin of the ship. Boat and ship building are very ancient arts, and it will surprise many readers to learn how much China and the Pacific have contributed to man's conquest of the waters. The authors are on more familiar ground when they turn to the exploits of the Phœnicians and other Mediterranean races of classical times. They give us also fascinating glimpses of the beginnings of Norse seamanship, and this story is continued when they pass on to the Middle Ages, a mixed tale of warfare and piracy as well as the revival of trade and shipping. It was during this period that the stern rudder took the place of the steering paddle or oar, probably as a result of the better use of side-winds by the more efficient sailing ships of northern waters.

And so we go on with absorbingly interesting stories of the Crusaders' vessels, and of carracks and galleys that carried cargoes of all kinds about the known world, until we reach the time of the great navigators. The authors show how the growing realisation that the Earth is round paved the way for the wonderful voyages of Columbus, Magellan and other pioneers of the sea, who set out on uncharted courses to reach lands believed to be sources of spices and precious metals. Great names confront the reader here in addition to those already mentioned, among them John Cabot, Hawkins, Drake and other great Elizabethan mariners.

The struggle for the sovereignty of the seas that now began contributed greatly to the development of ships, and here we can follow the changes in size and design through the galleons of the time of the Armada, and the vessels in which the English and the Dutch fought out their wars, to the larger merchantmen and the three-decker line-of-battle ships of Nelson's day. During this period there were also great advances in the science of navigation. The clumsy cross-staff and the astrolabe were replaced by the quadraut and the sextant; the chronometer invented by John Harrison showed the way to the determination of longitude, and the mariner's compass was greatly improved. There was as yet no corresponding advance in comfort for the men before the mast, although ships were larger and roomier; the smallest breach of discipline was still punished by flogging.

This brings the authors to the story of shipping in the last 150 years. In turn we see the development of the East Indiamen, the early whalers, the clippers and the huge windjammers. These were vessels of great beauty and romance, ships of a type that we shall never see again, for they were soon made obsolete by the coming of steam, which in turn found a formidable rival in Diesel and Diesel-electric propulsion. This in itself is a great story, and here we can follow it from the earliest efforts to fit engines into ships, through the successful experiments of Fulton and Bell down to the most modern giant liner, equipped with radar, gyroscopic compass and every refinement that modern science can give.

There is an interesting contrast in the following section. In this yachts, Thames barges, fishing vessels and other small craft are surveyed, and the attraction they have for all of us is made very clear.

Finally the authors look into the future. Throughout the book they have never forgotten to show us how the ship has been "a mirror of the times in which she sails," and they look forward to the time when modern social ideas will be reflected in ships manned by a well-educated merchant service, living in comfort as they go about their dangerous and difficult tasks.

**"Ships and Men," by W. J. Bassett-Lowke and G. Holland. Published by George G. Harrap and Co. Ltd. Price 15/- net.*

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller.

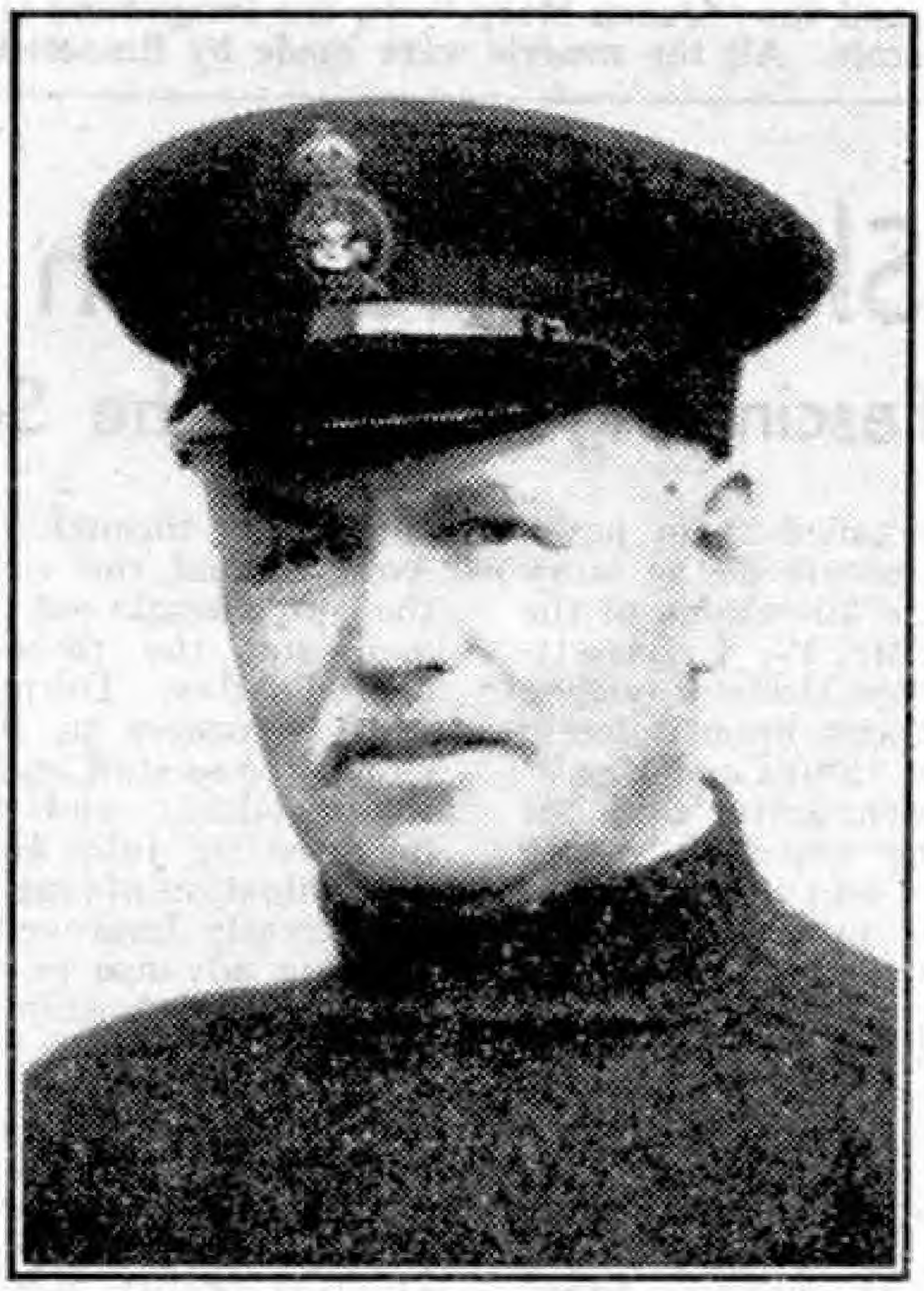
"Storm on the Waters"

By CHARLES VINCE

(Hodder and Stoughton. 6/- net)

When the war began there was a lively recollection in the life-boat service of the difficulties and dangers of the previous one of 1914-18. Now there was air attack also to be taken into account, and the effect of this on supplies and on the actual work of the life-boatmen could scarcely be anticipated. In the darkness of the new war the life-boatmen rose magnificently to the occasion, as Mr. Vince shows. He traces their war record step by step, and a wonderful story it makes.

Dunkirk saw the first intensive call on the life-boat service. Two life-boats were already on their way there when the call to action was telephoned to 18 stations on the South East Coast, and the part that all played in the rescue of 300,000 men from the closing hands of the enemy is one of which the life-boatmen can justly be proud.



Coxswain Robert Cross, G.M., of the Humber life-boat. From "Storm on the Waters," reviewed on this page.

This was only the beginning of devoted service that was continually changing in character. Most of the calls now came from aircraft, and the life-boats actually went out more than 1,000 times on such missions. One specially moving chapter tells the story of the Humber life-boat, and the wonderful rescue by Coxswain Robert Cross and the men of this boat in a January gale of the crew of a defence unit that had broken from its moorings. Time and again, with marvellous seamanship, the life-boat was taken up to the wrecked vessel, and after 20 attempts six of the nine men had been taken off. Then one of the life-boat's engines stopped, but with only one propeller turning the life-boatmen continued their perilous efforts until the last three men had been brought to safety. In other sections we read of the help that life-boatmen gave in that great war high road the North Sea, to convoys, and also to the men of Bomber Command during the great offensive of the last years of the war, when in the course of 1,050 searches 142 airmen were rescued.

Every page of Mr. Vince's book is packed with interest, and the story he has to tell will increase immeasurably our admiration of the life-boat service and the men who make up its personnel. Portraits of coxswains who rendered outstanding service during the war and of others connected with the life-boat service add to the interest of the book.

"The A.B.C. of L.N.E.R. Locomotives"

(Ian Allan Ltd. 2/-)

The re-numbering of L.N.E.R. locomotives gives special interest to the appearance of this booklet in the A.B.C. series, for it deals with this L.N.E.R. scheme and is described as the "Re-numbering Edition." It follows the usual A.B.C. plan. The lists are arranged numerically under class headings, the new numbers appearing in one column with the corresponding old numbers alongside them, and are followed by a list of L.N.E.R. named engines, arranged in their respective classes, a table of dimensions and details of the principal locomotive depots in the different areas of the L.N.E.R.

For its size the booklet contains a surprisingly large amount of information and it is well illustrated. Copies are obtainable from A.B.C. Locomotive Books, Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 2/2½ post free.

G.W.R. down Oxford line express headed by No. 4086 "Builth Castle." This illustration, from a photograph by M. W. Earley, appears in "My Best Railway Photographs, No. 3," reviewed on this page.

"My Best Railway Photographs"

No. 2, by O. J. MORRIS;
No. 3, by M. W. EARLEY
(Ian Allan Ltd. 1/6 each)

This series of booklets, begun with Canon Treacey's selection of his best L.M.S. photographs, reviewed last month, is admirably continued by Mr. Morris and Mr. Earley, both well known and highly successful railway photographers. Mr. O. J. Morris specialises in S.R. subjects, and here are some of his characteristic efforts, taken on cross-country and other routes as well as on main lines; Mr. Earley covers the G.W.R. and the western lines of the S.R. In each case the author describes at some length the equipment and methods he employs, and the excellent examples reproduced, with the details of plates, exposure and stop used in securing them, will be very helpful to less experienced photographers and highly attractive to railway enthusiasts generally.

Copies of the booklets are obtainable from A.B.C. Locomotive Books, Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 1/8½ each post free.

"G.W.R. Engines"

By W. G. CHAPMAN
(G.W.R. 2/6)

This official G.W.R. "Engine Book," the first edition of which was published in 1938, presents a comprehensive record of modern G.W.R. locomotive practice. The story of locomotive names, with special reference to the G.W.R., makes a fine beginning, after which come sections on G.W.R. numbers, types and classes. Then follows a survey of G.W.R. locomotives since 1895. The present standard locomotive classes are dealt with in detail, with dimensioned diagrams and photographic illustrations, and there are sections dealing with such topics as Swindon Works, the war service of G.W.R. engines, train speeds, the use of oil fuel and possible future developments.

The booklet is full of information that will appeal to all railway enthusiasts. It is obtainable from Messrs. Wyman's and W. H. Smith's bookstalls or shops; or, post free, from the G.W.R. Central Enquiry Bureau, 14, Bishop's Bridge Road, London W.2.

"Round the Southern Fleet"

By CUTHBERT GRASEMANN
(Ian Allan. 2/6 net)

The vessels here described and illustrated are those that extend the Southern Railway services beyond our coasts to Calais, Dieppe, Dunkirk, the Isle of Wight and the Channel Islands. Many of them played a distinguished part in the war, some indeed in two wars, and each has some special feature of interest, as Mr. Grasemann makes clear in the brief accounts he gives of their building and services. These are not just dry records of facts and figures. The aim of the author has been to give the impression that he is taking the reader on a trip round the fleet.

For almost every vessel in the S.R. fleet there is a full page illustration with the story opposite. Many of the vessels described have a double interest because of their direct linking with railway services. Among these are the turbine steamer *"Canterbury,"* built expressly for the *"Golden Arrow"* service, and the ships designed and built for the cross-Channel Train Ferry, with their two funnels side by side. Other vessels of special interest include the *"Invicta,"* completed only in 1940 and here shown in wartime paint, the turbine steamer *"Worthing,"* the fastest in the fleet, and *"Solent,"* the oldest. A useful table gives the measurements and service of each vessel.

The booklet can be obtained from A.B.C. Locomotive Series, Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, 2/9 post free.

A Railwayman Abroad, 1944-46

II—Conditions in Germany

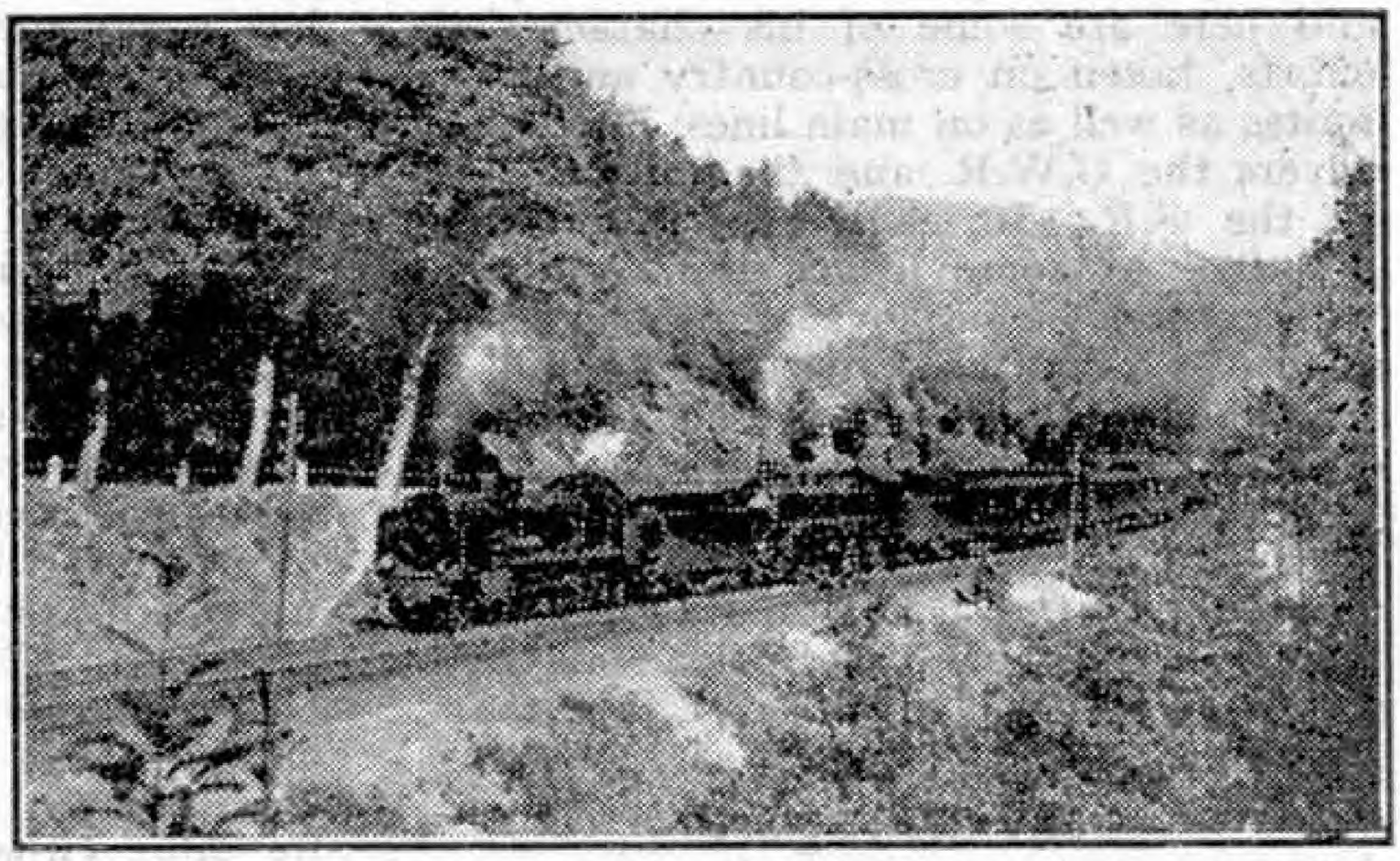
By D. S. Barrie, M.B.E.

FEW tasks as tremendous as that which presented itself to the Allied authorities responsible for the reorganisation of the German railways after the fall of Germany can ever have confronted a victorious Power. Dwarfed as it was at the time by the colossal magnitude of the collapse of the entire German structure, the job of getting the railways going again was in itself as great as it was urgent, by reason of the necessities of maintaining and moving the Allied armies, repatriating Displaced Persons of many nationalities, restarting the movement of coal from the Ruhr to Western Europe, and providing transport essential for the minimum economic life of Germany itself.

When the victorious Allied armies struck across the Rhine deep into Germany in the spring of 1945, the conditions of chaos on the railways—the *Deutsche Reichsbahn* that once was in the forefront of European railway technical achievement—were well-nigh unimaginable, especially in the Ruhr and in the dense network of lines leading from it to Munster, Osnabruck and Hanover. Every bridge across the Rhine in the British Zone was down; over 660 railway bridges in the British Zone were demolished; yards and stations were blocked by piles of debris (whole coaches and wagons flung atop of one another in fantastic confusion); hardly a signal worked, and scarcely one station in the areas fought over was in touch with another. Apart from the destruction of locomotives and rolling stock, many others were out of action through lack of maintenance or because they had been "cannibalised" for spare parts; numerous wagons and engines were also cut off on branch lines by the destruction of bridges.

Handicapped by shortages of spare parts, due to lack of maintenance of stocks by the Germans and the destruction of repair facilities, the Allied transportation troops, with the assistance of Germans under their supervision, worked miracles of rehabilitation, of which a few examples only must suffice. In the first seven months of the British occupation, the number of miles of track open for traffic increased from 650 to more than 6,500; 232 bridges were repaired; some two million Displaced Persons were evacuated, and the quantities of stores moved rose from a few hundred tons to 15,000 tons per day. (Official *"British Zone Review."*)

During this exciting period many interesting scenes were to be witnessed on the German railways. Travelling by leave train from the heart of Germany down through the edge of the Ruhr, with its melancholy string of wrecked locomotive depots and bomb- and shell-torn yards, one would ride in a German or Austrian vehicle which had been hastily repaired for the heavy traffic demands; the train would comprise from 12 to 16 such eight-wheelers with a total weight of up to 650 tons, the engine being any available machine—perhaps a "Pacific" of the "01" or "03" series, possibly a "41" class 2–8–2, or maybe even a German "austerity" 2–10–0 of the "50" or "52" series. Quite a number of these ten-coupled engines were fitted with enormous ten-wheeled condensing tenders, enabling the engine



Double heading through the mountains of South Germany in peacetime. Note the typical German engines and rolling stock running on the right-hand track.

to go long distances without replenishing the water supply.

The average speed of this train would be about 30 m.p.h. and the maximum perhaps 45 m.p.h. But in summer weather this gentle gait was acceptable enough because there was so much to see; passing a locomotive depot, for instance, one would note mostly 2–10–0 and 2–8–0 engines for the freight trains, with a large assortment of 2–8–2, 0–10–0 and 2–6–0 tank engines, and heavily-built 4–6–4 tanks for local passenger traffic. With any luck one might see at such a shed—and usually all the engines were outside because the shed itself was probably damaged—an assortment of non-German locomotives which had been "looted" by the Nazis and were now awaiting repatriation to their home countries. These might include Belgian 4–6–0s; French 0–8–0s, 2–8–0s, and 4–6–0s or 2–6–0s; and probably a few engines from the Netherlands. Later on in the journey one might overtake a "train" of half-a-dozen such repatriates being hauled slowly westwards, three or four empty wagons separating each pair of engines so as to spread the weight over the bridges.

A scene on the banks of the River Rhine near a demolished railway bridge. Every bridge over the Rhine in the British Zone of Germany was destroyed. British Official Photograph, Crown Copyright Reserved.

Trains in Germany run on the right-hand track, and the signals, which are mostly of the upper-quadrant type, face outwards, so that from an Englishman's view point they look "back to front." The normal distant signal is a yellow disc which is visible only in the "caution" position, being turned on its back when at "clear." An interesting feature of signals denoting diversion to other than the normal route (*e.g.*, fast to slow) is that they are placed beneath the ordinary stop semaphore and their normal position is vertical against the post, so that they do not appear at all so long as the train is taking the normal route. Colour light signalling is extensively used but much of this equipment was, of course, out of action.

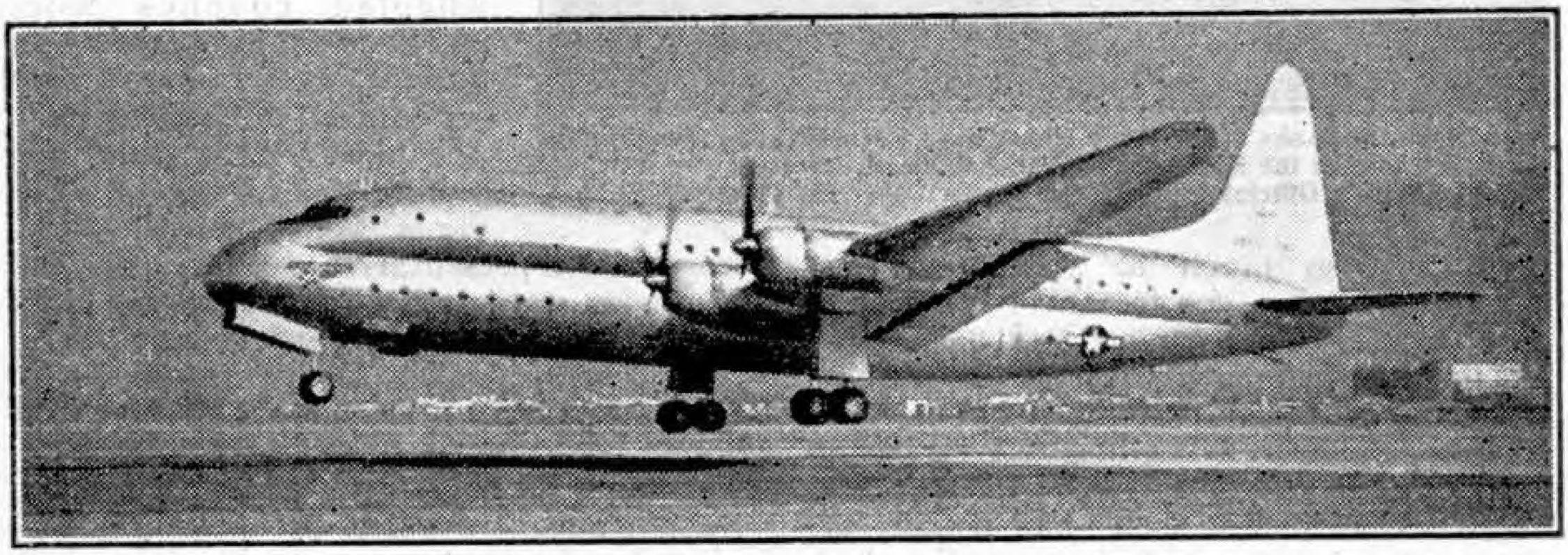
Continuing on our journey we might pass a large marshalling yard, with its piles of bombed rolling stock; entire sidings, points and crossings, taken up so that the material could be used elsewhere, and rows of derelict, damaged engines waiting their turn for evacuation and repair. At some of these marshalling yards, trains of 4- and 6-wheeled coaches were positioned in order to provide temporary homes for bombed-out railwaymen. A typical freight train seen pulling out of one of these yards would consist of 60 wagons, representative of nearly all European nationalities, behind a big 8- or 10-coupled engine; despite the efforts of the German police many hundreds of Germans, trying to get back to their homes or just wandering in search of work and a home, were wont to board these trains, travelling perhaps hundreds of miles in the worst weather in open trucks with no shelter but a blanket over their heads. German freight trains, incidentally, have no brake vans as such; being continuously-braked it is sufficient for the last vehicle to be denoted by a tail-lamp and a red-and-white "target," the guard riding in a small hutch on one of the ordinary vehicles.

Many other interesting trains might be seen on the German railways, such as German ambulance trains of as many as 30 steel cars behind a single "Pacific"; trains of up to 50 covered vans, or 30 four- or six-wheeled coaches laden with repatriate Displaced Persons on their way home, the sides of the vehicles bedecked with green foliage and patriotic slogans; or train-loads of covered vans full of disbanded German soldiers—sullen, silent, inglorious, the dejected remnants of a beaten *Wehrmacht*.

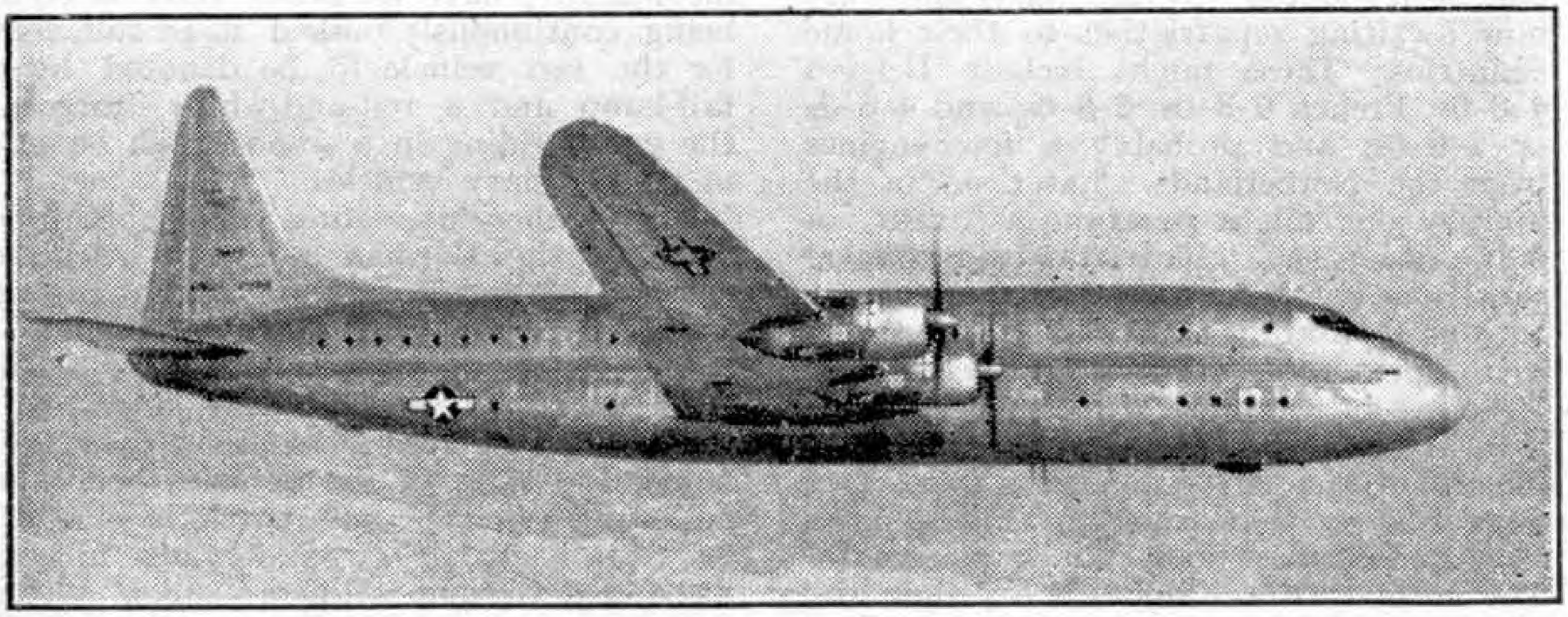
Every big German (Continued on page 94)

Test Flying a Giant Transport

The great size of the Lockheed "Constitution" transport, the largest aeroplane ever built for the United States Navy, is very evident as it stands alongside the modest 8-seat Lockheed 12, a 1936 passenger transport. The "Constitution" has a wing span of 189 ft., is 156 ft. long, and can carry up to 180 passengers. It is expected to fly on U.S. Naval Air Transport Service trans-Pacific routes some time this year. The photographs on this page are by courtesy of Lockheed Aircraft Corporation, U.S.A.



Taking-off for the first time, the "Constitution" lifts its 92 tons easily from the runway of the Lockheed Air Terminal, at Burbank, California. The machine took off at 110 m.p.h. after a run of only 1,820 ft.



The "Constitution" making its first flight. The four Pratt and Whitney "Wasp Major" engines develop a total of 12,000 h.p. and give the machine a speed of 300 m.p.h. Provision is made for conversion to gas-turbine power when this type of engine becomes available, and this change will increase the top speed to 400 m.p.h.

Photography

A Walk in Winter

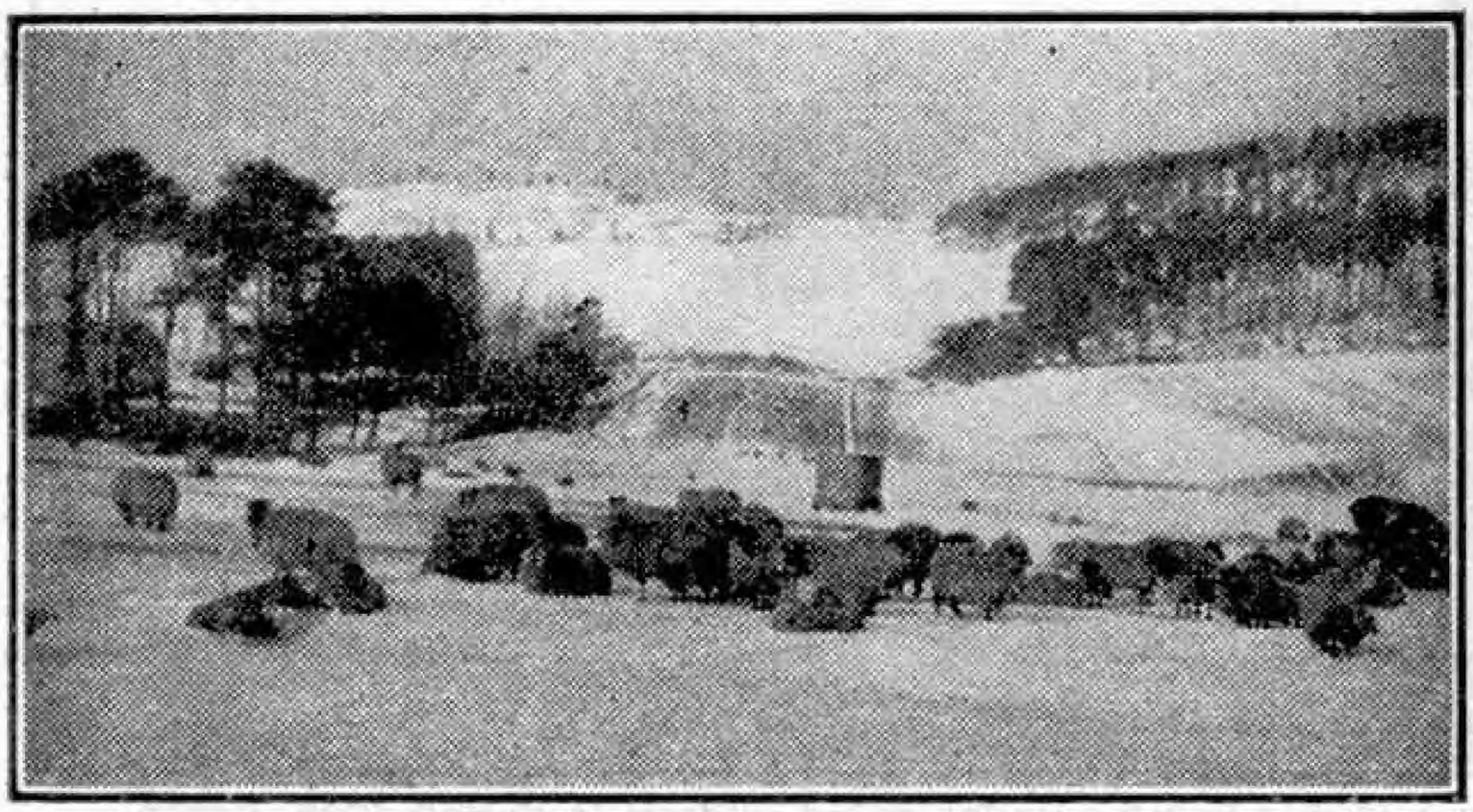
THERE was a time, not so many years ago, when winter was a "close" season for most amateur photographers. It is not so to-day, however, for the splendid high-speed films that are now available make it possible to take good pictures all the year round with even the most simple cameras.

Every photographer should try to get a few good winter pictures. Winter's charms are many and varied, and almost any walk in town or country will reveal beautiful subjects which at any other time of the year would not appear interesting. Frost, fog, and snow can create wonderful pictorial effects, and winter sunshine has a special quality of its own.

"Sunkissed Sea." By F. G. Reynolds, Sidcup.

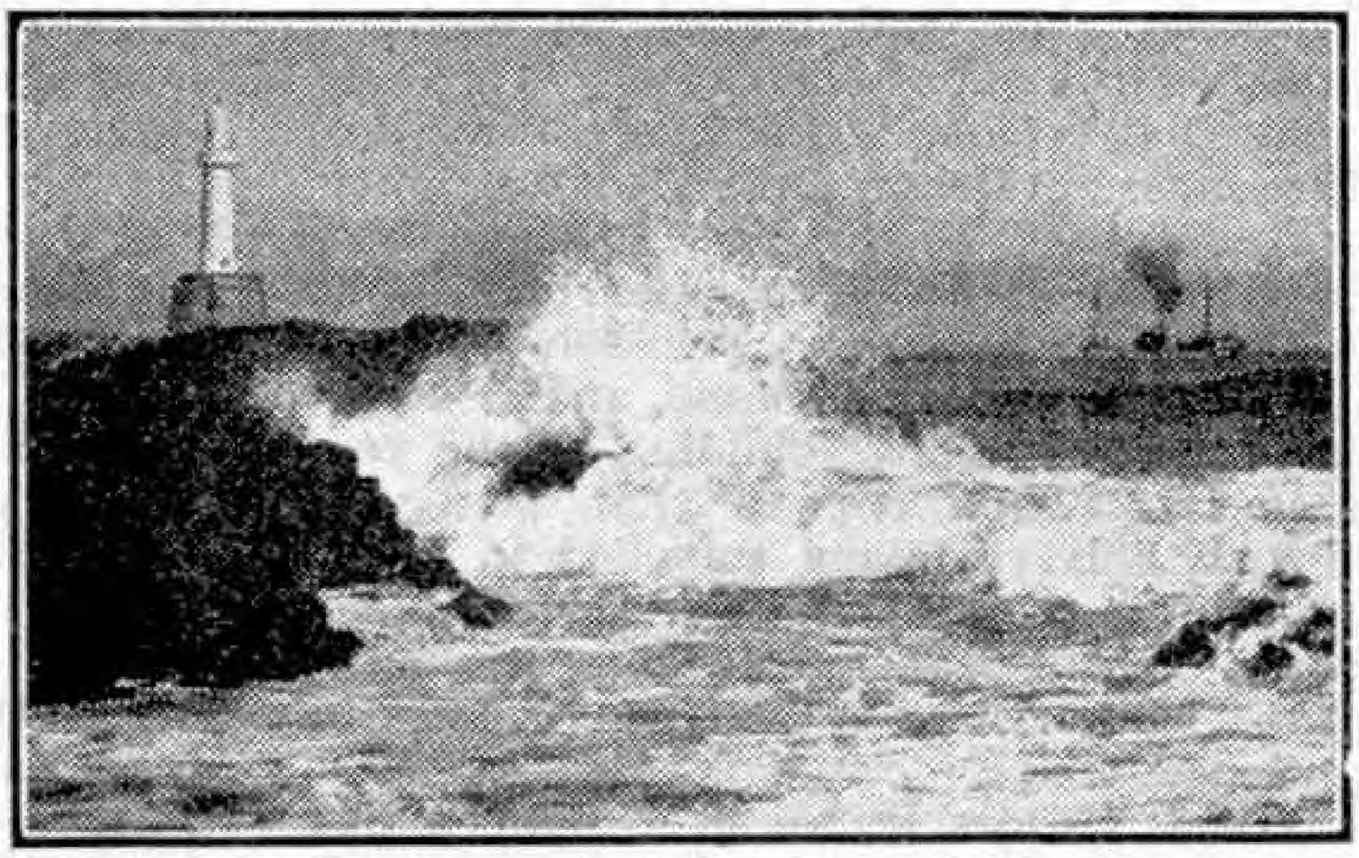
Winter skies are very often dull and uninteresting, but quite striking effects occur now and then, and it is well to be on the look out for these. Winter sunsets are well worth attention, but it is important to choose the right moment for them as they are apt to change with disconcerting rapidity.

An exposure meter or calculator is always of value, but in winter it becomes a sheer necessity. The light is deceptive, often appearing to be of higher actinic value than it really is, and it changes very rapidly. The brightest period is between the hours of 11 in the morning and 3 in the afternoon.



"Sheep and Snow." By W. Reid, Edinburgh.

Morning is usually the best time for winter photography, whether there is snow on the ground or not. Very beautiful effects are produced in quite commonplace surroundings when the sun is breaking through the morning mist, and while there is still enough mist to soften hard outlines. Successful pictures of this kind can be secured almost anywhere; it is the combination of mist and sunlight that is the important thing. Many strikingly beautiful pictures of this type have been taken along the river side or canal bank in the heart of an industrial town.



"Waves on the Breakwater." By J. H. Taylor, Aberdeen.

Peat and the Coal Shortage

Fuel Difficulties and Experiments in Eire

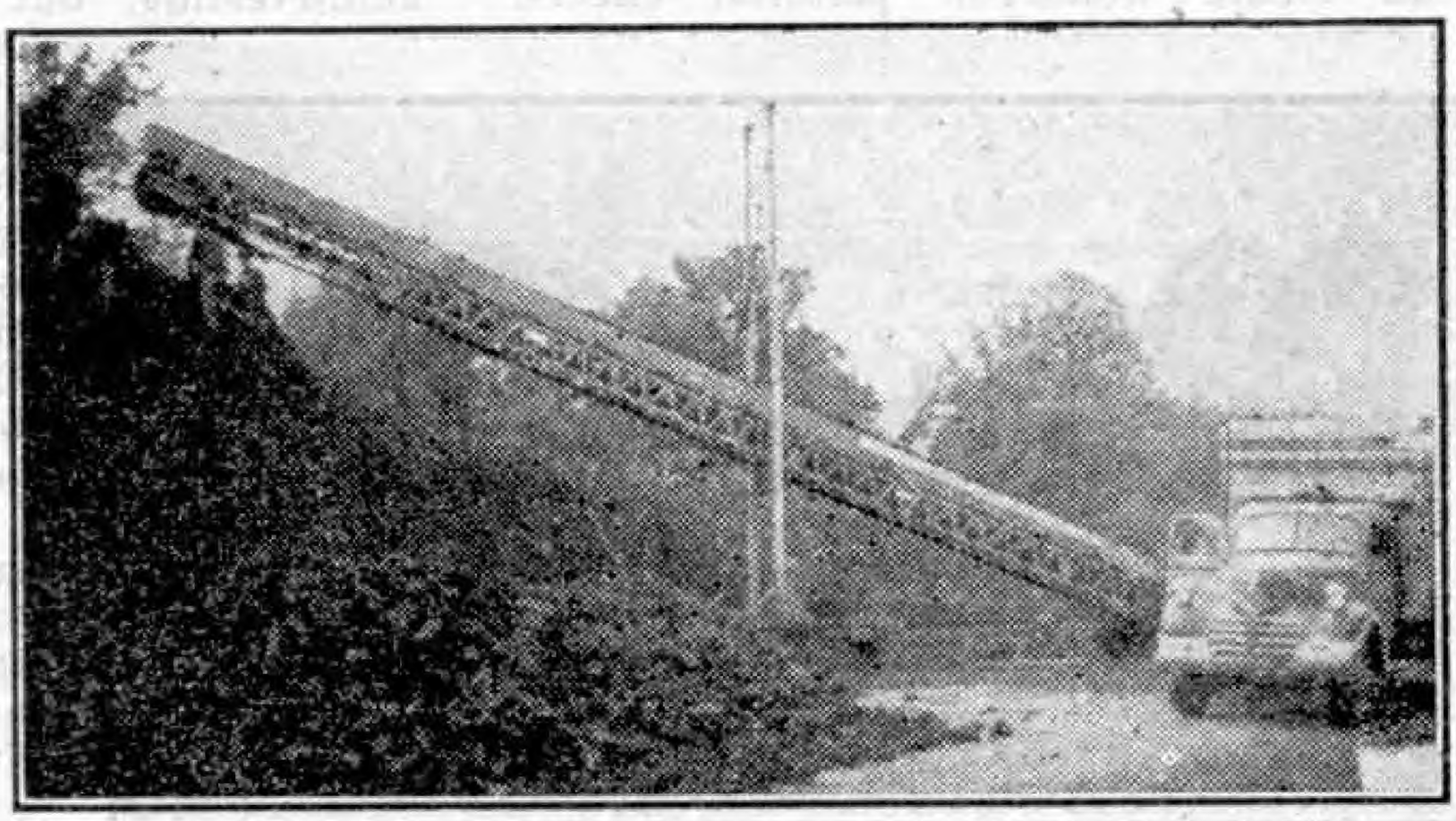
By M. Chesterman Moore

THE impatient voices of English and American holidaymakers mingled with those of Irish passengers as they paced the platform at a country station in County Tipperary. For almost two-and-a-half hours their train had stood still, and the hold-up was a sign of the times, the world-wide shortage of fuel. At the end of the long row of coaches a group of men were working to clear the ashes from the peat-choked furnace of the locomotive. This was no unusual job for them, for they have to carry out this essential duty as each train travels westward from Dublin.

In pre-war days, when coal was always at hand for the burning, people took their fuel for granted. Hardly a thought was turned to what made their homes warm and light, where gas and electric light and power came from, or what made the 8.15 a.m. train puff its way along the track, taking them to their offices and shops in the city. The reality came gradually as disaster overtook the world, and even in Ireland, a land which could provide its British visitors with the food delicacies they had missed, it was not possible to escape the truth.

As coal became scarce, the railways of Eire suffered. Behind the wall of neutrality, and deprived of supplies of fuel from Britain, the Irish authorities had to do some quick thinking. The solution was only to be reached at home, and it meant but one step, the re-building of the peat industry. Thus it was that last year British holidaymakers travelled in trains run on fuel in which there was a high percentage of peat and learned the maxim that "where there is peat, there must be patience."

When visitors arrive in Dublin to-day they get a picture of a city flowing with unrationed food and British exported goods. At night they stand aghast at the brilliance of neon signs, multi-coloured and magnificent, all adding to the "pre-war" atmosphere. How can there be a fuel shortage with such a display? The fact of the matter is that in tourist traffic Eire has one of its main industries, which this year has been unsurpassed in its intensity. Dublin is the showplace of the nation, and when a nation relies for its livelihood in part at least on dazzling its visitors with life they cannot get in their own homes, how necessary it is to muster a bold front!

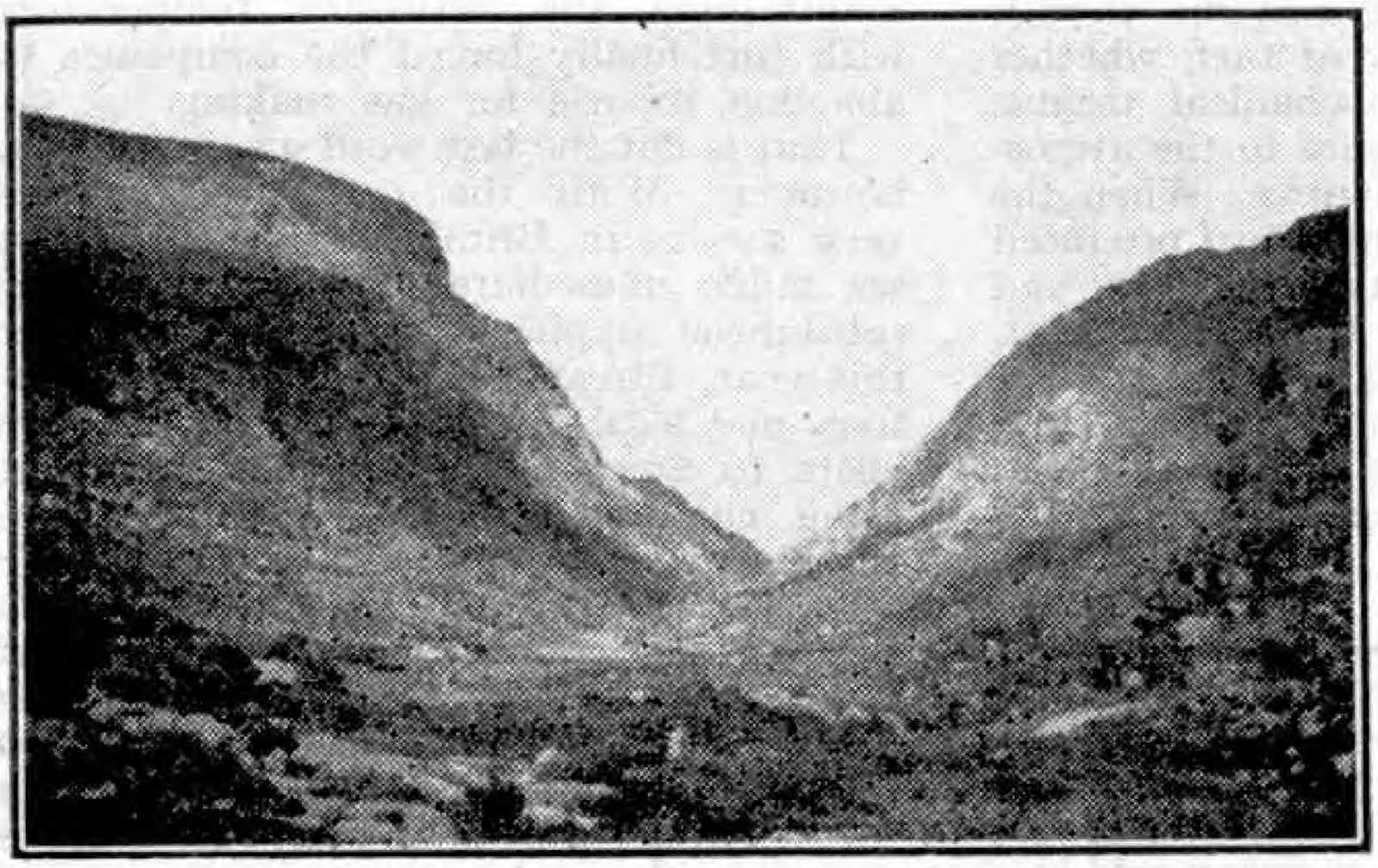


Peat stacked in tall piles for drying purposes in Phœnix Park, Dublin.

Less than a year ago Dublin was lit-up very modestly. During the war, the black-out restrictions were rigorously enforced, and yet even then fuel shortage was more than just a threat. The end of the war has not improved the position, and something was bound to suffer when the decision was made to allow full-scale illumination of the city. Thus for five hours of each day gas is not available for domestic purposes. Cafes have the food, but only at specified times can hot meals and grills be served.

When the fuel merchant calls at Dublin homes, it is not to deliver coal but to dump the quota of bags of peat, or, as the Irish prefer to say, bags of "turf." The ex-coalman, now turned "turfman," forms the last link in the chain of events

that brings peat from the producer to the consumer. The turf, probably cut in the Wicklow Hills, is conveyed in big American lorries to huge deposits run by retailers in the outskirts of the city. To the spacious Phœnix Park area of Dublin, within sight of the President's House, the turfmen bring their carts, some horse-drawn, others pulled by ponies. They shovel the rectangular block shapes into sacks, and, restricted to quota, have it checked out at the weighing office. Thence the householder receives it at about £2/14/– a ton.



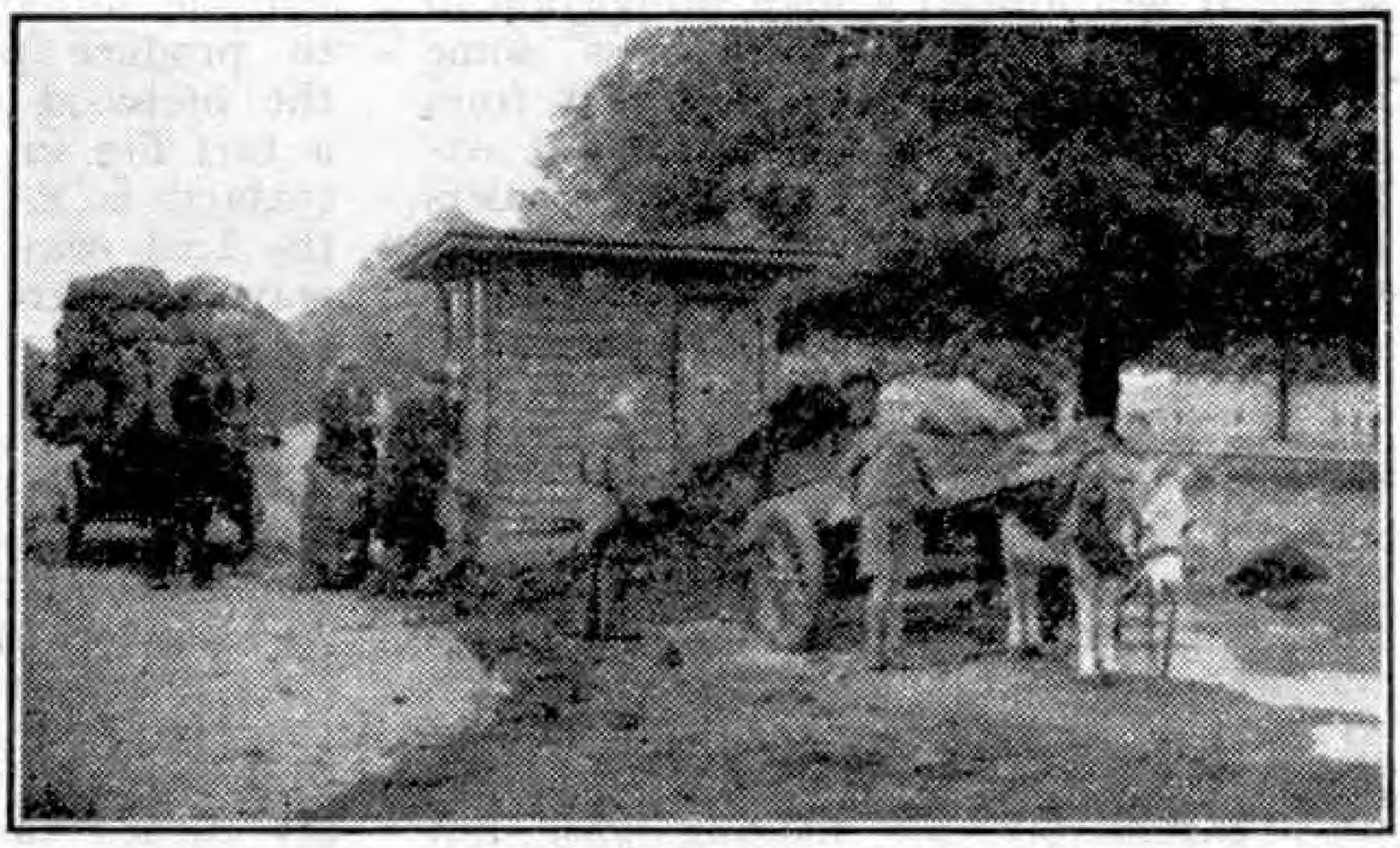
Amid wild Kerry scenery, where crofters cut their own peat.

Ireland contains 4,700 square miles of peat bogs, and is said to produce 6,000,000 tons of turf annually. Like coal, peat is the result of the decay of vegetation, but comparatively is a more recent product. Where there were stagnant pools the vegetation gradually disintegrated, became waterlogged, and sank to the bottom. With the passage of years, layer upon layer of this decaying vegetation was added, and the lower layers were compressed and carbonised. A moist atmosphere is particularly favourable to this process, especially where there is a mean temperature of about 45 deg. F.

It is nothing new to the Irish to see turf burning on their hearths. To them peat has been the regular fuel for centuries, but in the last generation coal burning was adopted by the city dwellers. For one thing, coal gives a more glowing heat than turf and is less brittle. For another, peat leaves far more ash, which explains why it is necessary to clean the grates of locomotives in the middle of a lengthy train journey, and also why housewives yearn for the return of domestic coal supplies.

In the country it is a different story. Amid the wilds of County Kerry, for example, the crofters have never known the benefits of coal. They rely for fuel on the turf from the ground near their homes. Armed with spade-like tools, known as "slades," they issue forth to cut the turf, and the sods are left to drain. Later they are stacked for drying in the air. This is called "bogging-it-out."

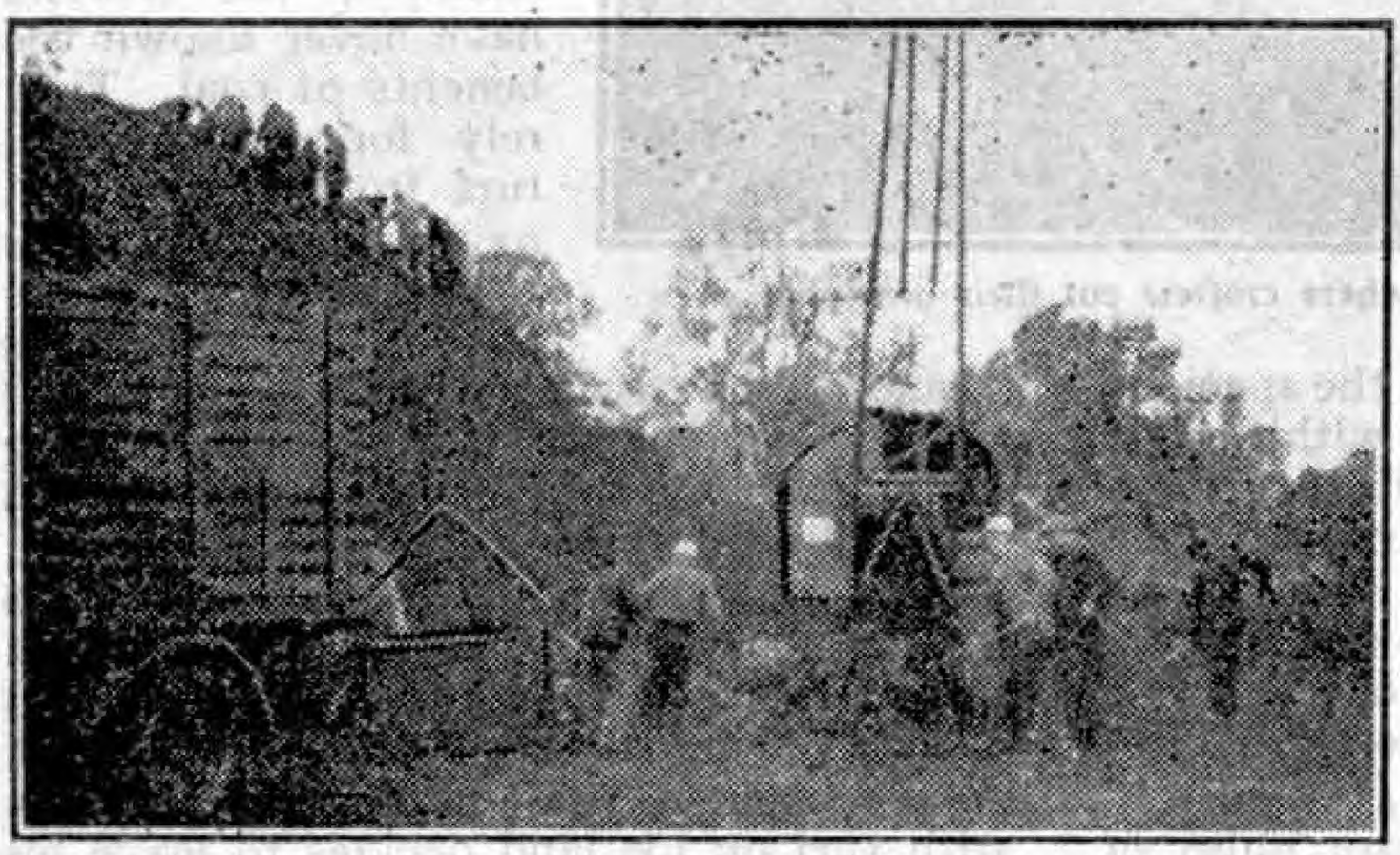
An interesting point to the stranger is that on many of these farms, large or small, the peat supplies on the land are included with the conditions of sale and tenancy on the houses. That is to say, if a person with turf on his land decides to leave his home, or let it to someone else, the new tenant assumes the right to use the peat bogs from which the domestic fuel supply usually comes. A farmer is not allowed to remove elsewhere and retain the peat grounds on the old land. If the countryman



Weighing out a load of peat.

has no private means of getting fuel, then he gets it from the retailer at a price considerably cheaper than in the towns. In Kerry, the turf costs about 30s. a ton.

The biggest snag in using peat on a large scale is in finding suitable storage facilities. The vast bulk of turf, whether cut by hand or by mechanical means, is dried by normal exposure to the atmosphere in the summer months. When the "bottom peat" is cut, that is turf produced from low lying districts by rivers and lakes, it contains no less than 90 per cent. of water. It can be well realised that in such a condition it would be of no use as fuel. So the turf has to be dried, and on the average the water content can be reduced to 25 per cent.



Stacking by crane in progress in Phœnix Park. Peat shovelled into containers is hoisted to the top of the stack.

Incidentally, there were many cases during the war of racketeers who purposely sold peat with a high percentage of water content, so as to make the turf weigh heavier. Because peat is so hygroscopic it will absorb a high proportion of water after being dried, unless some means can be found of keeping it from the rain. In weather such as that experienced last summer, the turf dealers have been hard put to in preserving the quality of their stocks.

But peat cannot replace the coal and coke used for purposes other than domestic. It has been a constant worry for the Irish Turf Development, an authority formed by the Eirean Government, to provide public utilities with adequate fuel. In Dublin, during one period of the war, the local gas company started to carbonise large quantities of turf mixed with coal. It was hoped to use peat extensively for making gas, but due to some chemical properties in the fuel, undue damage was caused to the big silica retorts. For the large gas works peat was not adopted, but in smaller and older works it was utilised for a considerable time. The high cost of maintaining the necessary temperature with turf finally forced the companies to abandon its use for gas making.

That is not the last word on the matter, however. With the coal position still very serious in Britain, the Irish do not see much immediate prospect of getting substantial supplies from over here. Earlier this year, Eirean Government representatives and local gas authorities both made visits to Sweden. There they saw peat being cut and dried by special steam-operated drying plants, in which the raw turf is converted into what is known as "turf coal." This is sent to the undertakings by rail, and carbonised for gas in much the same way as mineral coal.

The general conclusion from all these investigations is that air-dried turf is unsuitable for ordinary gas manufacture, and apart from technical difficulties, turf dried by the new method of briquetting is too costly. In the briquetting, by the way, the peat can be dried to such an extent that only 10 per cent. of water remains.

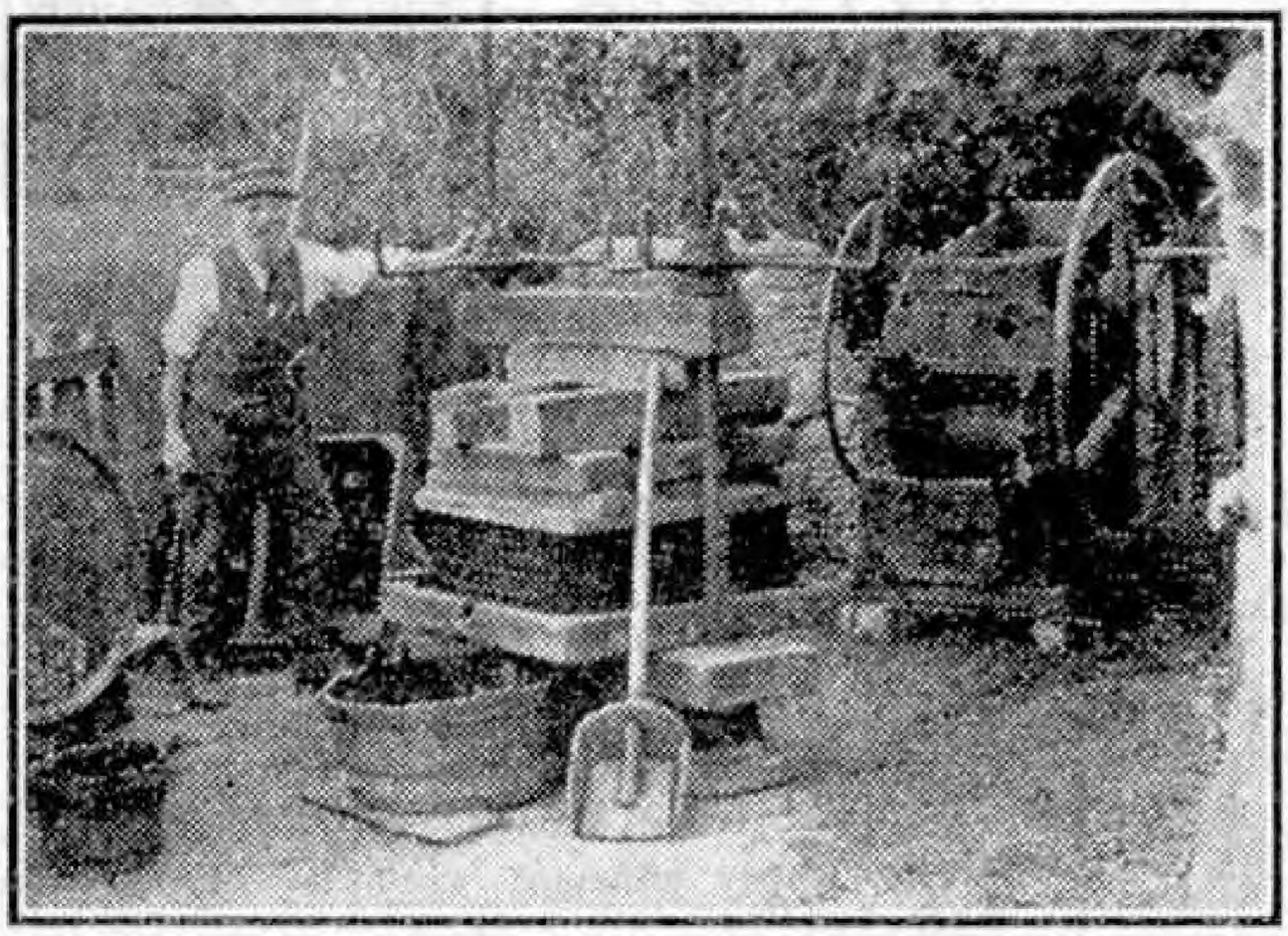
The fact remains that although peat is domestic fuel, and must continue as such in Ireland for some time, it will not oust the craving for "black diamonds." Only one county in Eire mines coal at any sizeable output, and in a country planning to produce new export goods coal is the lifeblood of industry. The smell of a turf fire in a lonely thatched crofter's cottage is a time-unchanged picture of the Irish way of life, but peat has only travelled part of the way towards the perfection that coal has attained as a fuel. There does not seem to be any satisfactory way of doing with it quickly what Nature has taken ages to do with the similar material from which coal has been formed. For this reason its uses are restricted, and its value for driving locomotives, producing gas, generating electricity and similar purposes is so low that it is not surprising to find that in Eire the eyes of progress are turned eastwards to Britain, whence the needed coal will come.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A NARROW GAUGE LINE IN CEYLON

The 2 ft. 6 in. narrow gauge Uda-Pussellawa line commences at Nanu Oya Junction, on the main up-country line of the Ceylon Government Railway, and extends for 19 miles to Ragalla, which is nine miles short of Uda-Pussellawa, the terminus originally planned. It climbs from an altitude of 5,292 ft. at the junction through the hill-resort of Nuwara Eliya, and reaches its summit of 6,500 ft. above sea level at Kandapola, before descending to Ragalla, 1,500 ft. below. By adopting sharp curves, on some of which the trains actually reverse their direction, and gradients as steep as 1 in 24, the need for tunnels and bridges was avoided in this hilly country. A speed limit of 12 m.p.h. is enforced.



A veteran Herefordshire cider maker alongside his press. The apple grinder is seen on the right. Photograph by C. Turner, Brockenhurst.

The line is single, with two passing loops and a siding. Passenger traffic had declined in recent years, due to competition from bus services running on a road that in places is alongside the railway, and was suspended during wartime. One of the four-wheeled coaches has been retained to carry the permanent way staff to their duties.

Goods traffic consists of two journeys, both starting from Nanu Oya Junction. One is a morning trip to Ragalla, returning in the afternoon, worked by a Garratt locomotive, the other an evening run to Nuwara Eliya and back, worked by 0-4-2T No. 130, built in 1904 by the Hunslet Engine Co. Ltd., and still going strong! This particular engine carries its coal in a bunker on top of the boiler instead of behind the cab in the more usual position.

All the engines carry "cow-catchers," large electric headlights and bells for use on race-days at Nuwara Eliya, where the track passes close to the racecourse. The loud whistles also fitted were found to have an upsetting effect upon the horses while racing!

The goods wagons are not fitted with vacuum brakes, and their tare weight varies between two and three tons. The vans have curved bumper bars at each end, instead of central spring buffers. Passenger guard's vans are used as brake vans.

The railway passes through many large tea estates, some of which deliver their tea to small platforms by the lineside, where it is stored in large sheds, until there is sufficient to warrant a special stop by the train. The tea chests are transhipped at Nanu Oya Junction, en route to Colombo, for export.

J. Stephens (India).

"CIDER MAKING"

Herefordshire is one of the chief counties for the making of cider, and the accompanying illustration shows this famous beverage being made in the traditional manner. The veteran shown in this is pressing down the hair mats full of crushed apple pulp made in the grinding apparatus seen on the right of the picture. All pulping is done by putting the fruit into the long box fixed on the top of the grinder, which is worked by two wheels. Bags of apples to be crushed or "ground down," to use the local expression, are seen at the back of the machinery.

From the grinding machine the pulp is placed in the hair mats by means of a wooden scoop, which can be seen by the tub into which the juice runs. The liquid is removed to a larger barrel, into which it is run through a tun dish placed on the top.

When the barrel is full the liquid has to be left until it has gone through a process of fermentation, which usually takes about nine days. It is then an intoxicating liquor or drink. Prior to this the juice is very sweet, far too sweet indeed for most people excepting children, who love to sip it.

The barrel that can be seen on the left of the illustration was marked "P." This meant that it had been used for perry, a beverage made from pears only.

C. Turner (Brockenhurst).

0-4-2T No. 130 on the Uda-Pussellawa line, Ceylon. Photograph by J. Stephens, India.

Among the Model-Builders

By "Spanner"

Alan Proctor, a keen Canadian model-builder living at Ottawa.

A NOVELTY IN CLUTCH CONSTRUCTION

In the construction of many different kinds of mechanisms it is necessary to include means of engaging or dis-engaging the driving power at will. Devices of this kind are known as clutches, and examples of mechanisms in which they are required are gear-boxes for motor cars, cranes, and machine tools. There are many different forms of clutch mechanism, some of which are designed for particular applications, while others are of a more universal nature and are adaptable to models of widely different types. One of the more specialised kinds is shown in Fig. 1. In this model a single Pawl is used as a striker to illustrate the engaging principle, but when the device is to be incorporated in a working model two Pawls should be provided to ensure that the faces of the clutch engage evenly.

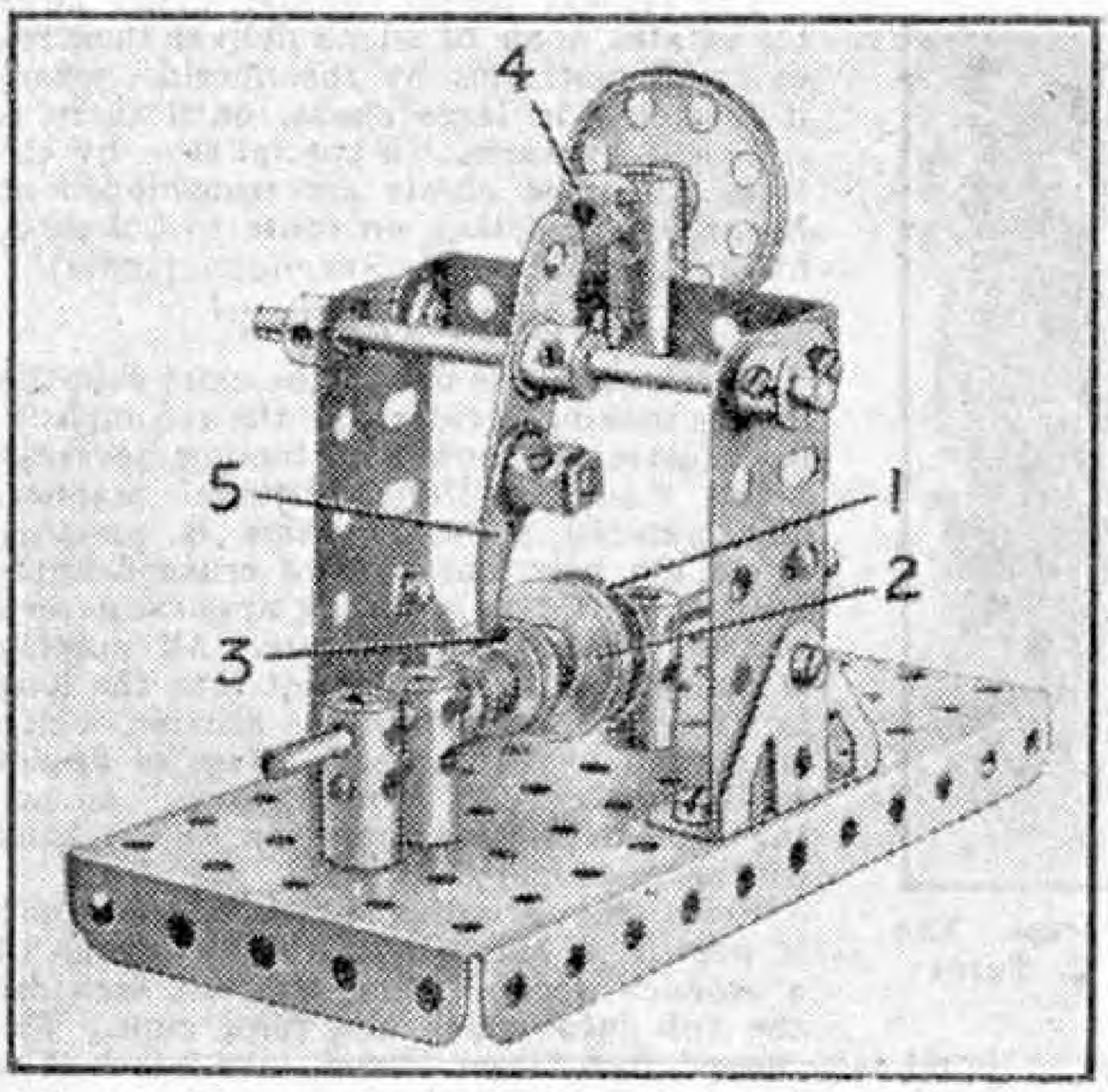


Fig. 1. The novel clutch device described on this page.

The two clutch plates are made from a ½" Pulley 1 fitted with a Rubber Ring, and a ¾" Flanged Wheel 2 separated by a Compression Spring. Each clutch member is locked on a separate Rod supported by bearings formed by Couplings, as shown in the illustration. A Pulley 3 is used to engage the clutch and is pushed into position by a Pawl 5 that acts as a striker. The Pawl is attached to one arm of a Double Arm Crank. A 2" Rod fixed in the boss of a Bush Wheel is threaded through a Strip Coupling, and a Coupling 4 is attached to its other end. When the Bush Wheel is turned in a clockwise direction, the Coupling 4 presses against an arm of the Crank and the striker causes the clutch to engage.

BRAKES FOR MECCANO MECHANISMS

Among the many different kinds of brakes or speed-retarding devices used in engineering there are several that can be applied very easily to Meccano models. Every model-builder therefore should be familiar with three or four different types so that when a brake is required in a mechanism he can choose one that is suitable for his purpose. One of the most powerful and yet simple brake devices is that in which the brake "shoes" are applied or withdrawn from the rotating part by means of a screw. Many large cranes employ brakes of this type, which are known as external contracting brakes.

A simple form of a screw-operated external contracting brake built from Meccano is shown in Fig. 2 on this page. In this the brake drum 1 is built up from two 1½" Flanged Wheels, but if greater pressure is required, these may be replaced by Wheel Flanges. Each brake shoe consists of 3½" Strips 2 and 3, which are held in place at their lower ends against 1½" Bolts as shown. The Strip 2 is fitted with a Threaded Crank 4 that moves laterally on a 3½" Threaded Rod 5. The Threaded Rod passes through the upper end hole of the Strip and bears against a Threaded Boss 6.

The Threaded Rod is journalled in the ends of Strips bolted to the Flanged Plates and one end of it bears a Bush Wheel fitted with a Threaded Pin to form a handle.

THE ADAPTABILITY OF MECCANO

Two widely different examples of Meccano model-building, each a splendid achievement in construction, are shown in Figs. 3 and 4 on the next page. These are the work of a clever Belgian model-builder, J. Willems, Antwerp, and together they are an excellent demonstration of the adaptability and scope of Meccano. One of the models represents a giant crane and the other a Jazz orchestra. There is a great deal of fun in building up amusing figures of various types and arranging them in suitable combinations, and the very realistic effect obtained in Willem's orchestra is due to a combination of model-building skill and

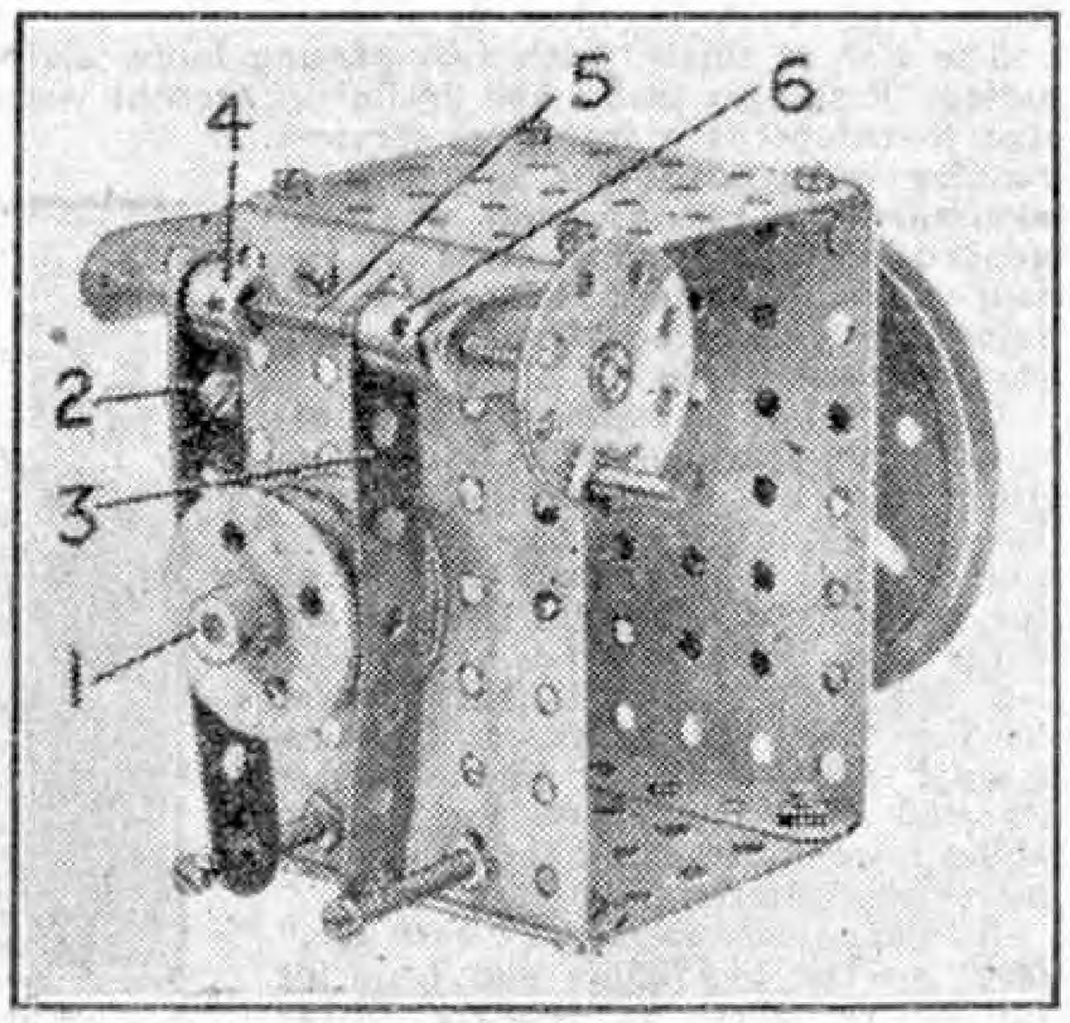


Fig. 2. Screw-operated shoe brake adaptable to many different types of mechanism.

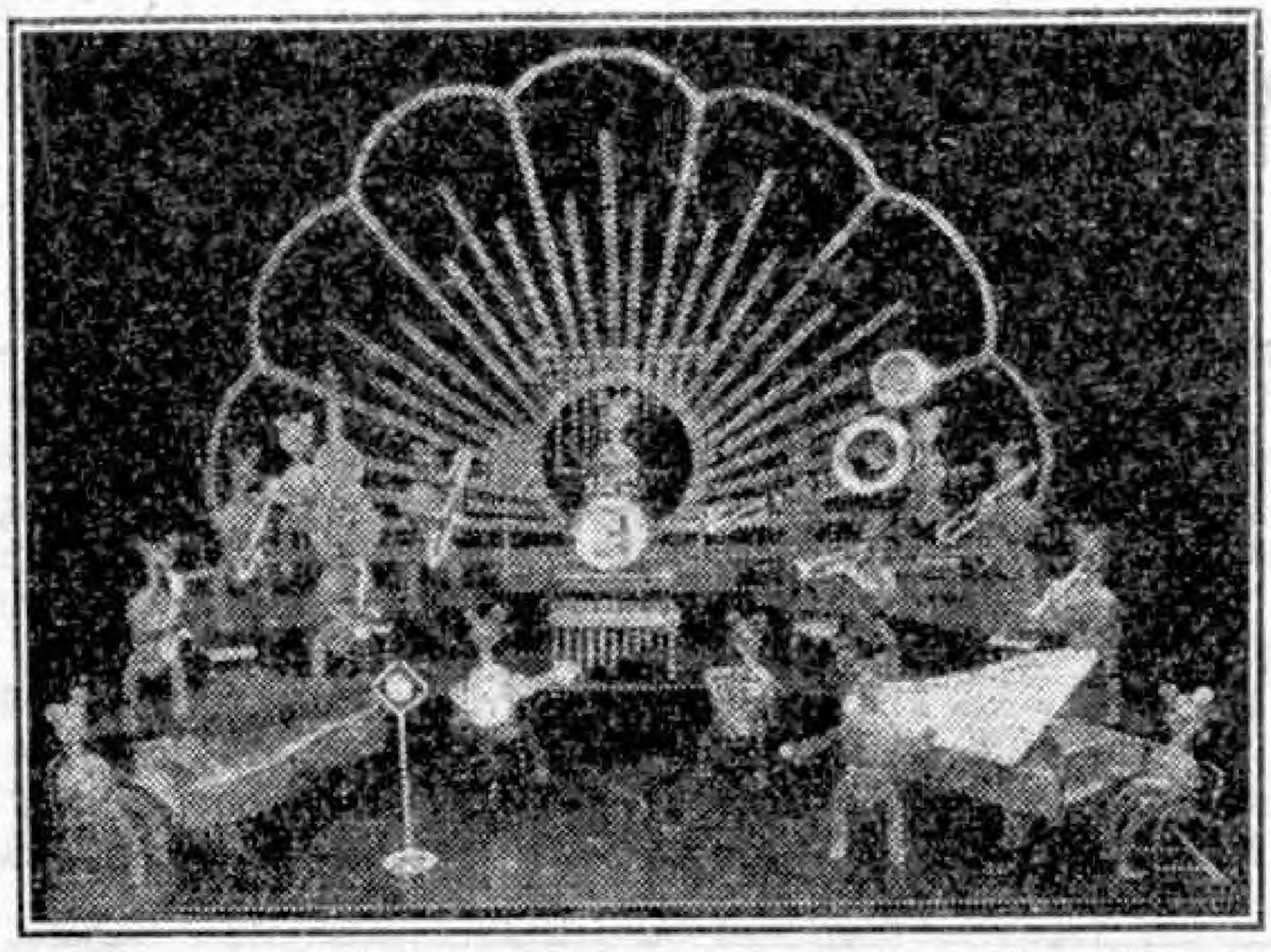


Fig. 3. A remarkably realistic Jazz orchestra built entirely in Meccano, by J. Willems, Antwerp.

artistic grouping of the players and other components of the setting. There is a mass of interesting detail work to be seen both in the figures and their instruments, and I strongly advise all model-builders who have not so far attempted models of this kind to do so at the first opportunity. I shall be glad to receive photographs of any such models that readers care to send.

Equally clever work has been done in the model crane, which is based on an actual 250-ton crane at work in Belgium. It is of an unusual type, one portion of the boom or jib being hinged near the rear so that it can be raised from the horizontal when desired. The illustration shows the crane with the boom horizontal and also in its raised position. Rails are laid along the top of the boom, and a small auxiliary travelling crane runs to and fro along these when the boom is horizontal.

The model is electrically operated and is fitted with lights. All the controls are situated in the cabin at the rear of the boom.

PRACTICAL TOOLS MADE FROM MECCANO

Many useful tools can be made from Meccano parts and these include hacksaw frames, drills, fretsaw machines, and gauges. Fretsaws and hacksaw frames can be fitted with tensioning devices operated by means of Screwed Rods and Collars, while Couplings will be found useful as drill chucks, the drill being inserted in the longitudinal bore and held firmly by the grub screws.

A simple but efficient wood gauge can be constructed by fixing a gramophone needle to one end of a Rod and at right angles to it, by means of a Coupling, and then fitting a second Coupling on the Rod so that it can be moved backward and forward as required.

Simple lathes capable of turning small wooden articles also can be made in Meccano, but these are subjects that should only be tackled by readers who possess a really good stock of parts.

Grand "Winter" Model-Building Competition

Have You Sent in Your Entry?

This is the second announcement of the "*Winter Model-Building Contest*," details of which first appeared in the January "*M.M.*" This Contest is still open, and it provides a fine opportunity for all keen model-builders to win prizes for their handiwork. There are no difficult conditions to fulfil and models may be of any kind and of any size. They must, however, be built entirely from Meccano parts. Cranes, motor vehicles, ships, machines of all types and aircraft are some of the many suitable subjects.

Readers who are new to the Meccano competitions are specially asked to note that *the actual model must not be sent.* A photograph, or if this is not possible, a good sketch, together with brief details of the model's main features, is all that is required.

The competition will be divided into two sections—A, for competitors of all ages living in the British Isles; B, for competitors of all ages living Overseas. Section A will close for entries on 28th February, but the Overseas Section will remain open until 30th June.

The following prizes will be awarded in each Section of the Contest: First £2/2/-. Second £1/1/-. Third 10/6. There will be also a number of consolation awards and Certificates of Merit.

Competitors must write their name, address and age, on the back of each photograph or drawing sent in, and envelopes must be addressed "*Winter Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13.*"

All prize-winners will be notified by post as soon after the closing date as possible, and a selection of the best models will be illustrated when possible in the "*M.M.*" Models that already appear in any of the Meccano publications are not eligible for entry in this Contest.

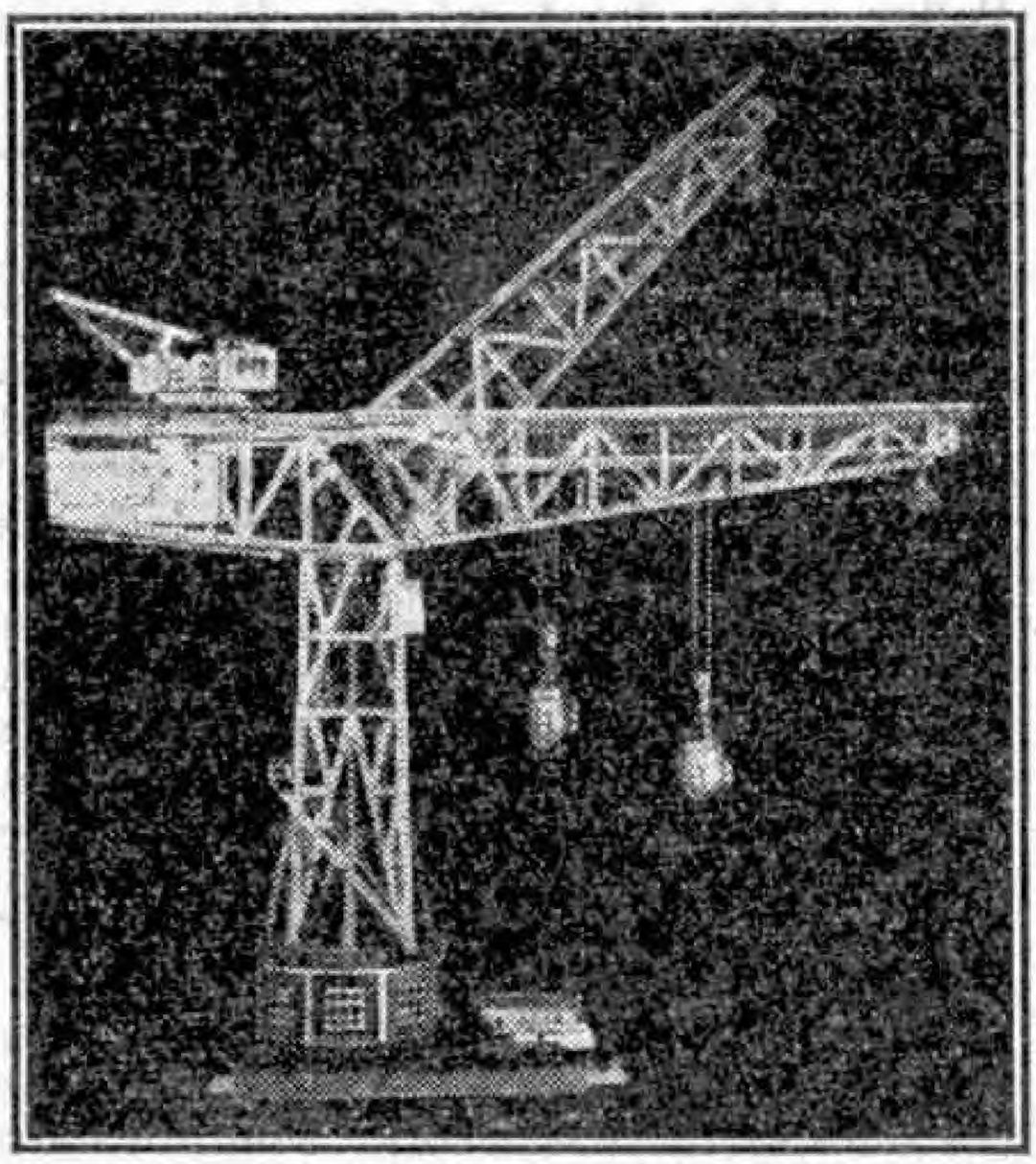


Fig. 4. A splendid model of a 250-ton Belgian crane also by J. Willems. It is a composite photograph taken to show the jib in both raised and horizontal positions.

New Meccano Models

Motor Truck—Spring Pistol

FEW parts are needed to build the model truck illustrated in Fig. 1 and it will certainly prove an interesting subject for the young model-builder. It is typical of a truck used by the Army for light transportation duties. A *Magic* Motor is used to drive the model and it is great fun to see it rumbling across the floor at high speed.

It is best to start building the model by bolting a 1″ Triangular Plate 1 to each side of a 5½″ × 2½″ Flanged Plate 2. The points of the Triangular Plates are extended by Fishplates to form supports for the rear axle, which is a 3½″ Rod.

The front Stub axles are 2″ Rods locked in each end of a Coupling 3. A 1½″ Rod is held in the middle of the Coupling and passes through two 1″ Pulleys, one with boss and one without. The 1½″ Rod is then passed through the middle hole of the second row from the front of the Flanged Plate and held in place by a 1″ Pulley. The front wheels are 1″ Pulleys without bosses, and they are held in position by Collars and Washers.

Two 2½″ × ½″ Double Angle Strips are fastened inside the back of the truck to form seats. Another two 2½″ × ½″ Double Angle Strips 6 are fitted over the rear wheels to serve as mudguards, and are held in position by Fishplates attached to the 5½″ × 2½″ Plate.

The front mudguards are two 2″ Strips 7 bolted together as shown. The inner Strip is joined to the front of the 5½″ × 2½″ Plate. An Obtuse Angle Bracket 8 is attached to the front of the outer Strip, and an Angle Bracket and a Fishplate are bolted to its other end. A 1½″ Angle Girder is bolted to each side of the Flanged Plate to form a running board. The bumper is a 3½″ × ½″ Double Angle Strip and is attached to the baseplate by ½″ Reversed Angle Brackets. Two ¾″ Washers form each headlight and are bolted to Fishplates.

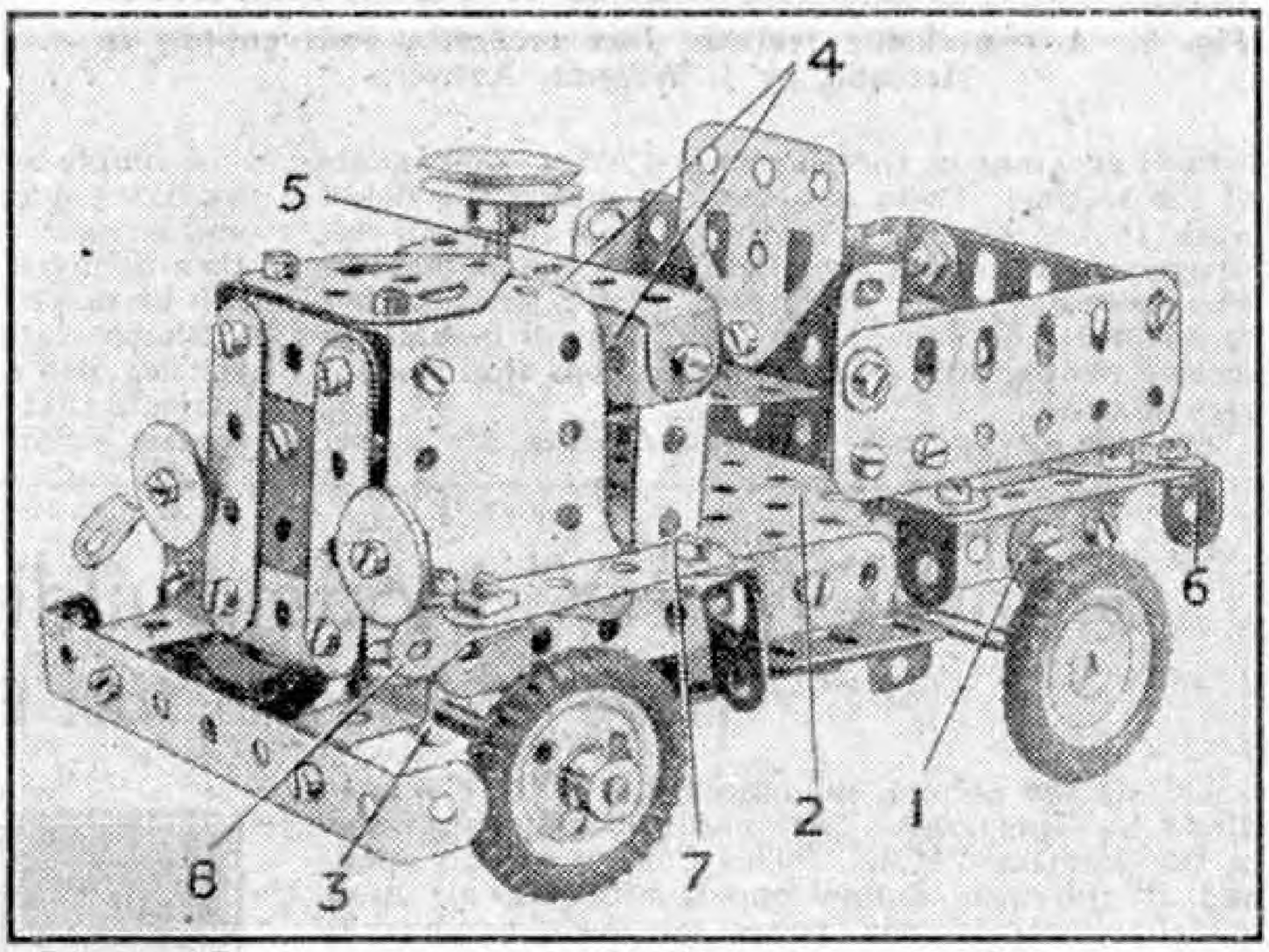


Fig. 1. A small military truck driven by a Magic Motor.

The radiator is built from two Flat Trunnions, two 2″ Strips and two 1½″ Strips. Two 2½″ × 1½″ Flexible Plates form the sides of the bonnet. They are braced on each side of the radiator by 1½″ × ½″ Double Angle Strips 4 and their ends are attached at each side to 1½″ Strips.

The steering is arranged by passing a 2½″ Rod 5, carrying a ½″ Pulley, through the second hole in the 2½″ × ½″ Double Angle Strip on the dashboard and then through the corresponding hole on the 5½″ × 1½″ Flanged Plate. The ½″ Pulley is connected by a driving cord to the 1″ Pulley on the 1½″ Rod.

Two 3″ Flat Girders are bolted to the Flanges of a 2½″ × ½″ Plate to make up the sides of the framework. The tailboard is a 2½″ Flat Girder and is connected to the sides with Angle Brackets. The sides and back of the truck are attached to the 5½″ × 2½″ Plate with two Angle Brackets.

A *Magic* Motor is fitted under the baseplate and it drives a 1″ Pulley on the rear axle.

Parts required for Model Lorry: 1 of No. 3; 6 of No. 6; 4 of No. 6a; 2 of No. 9f; 8 of No. 10; 5 of No. 12; 2 of No. 12c; 1 of No. 16; 1 of No. 16a; 2 of No. 17; 1 of No. 18a; 4 of No. 22; 3 of No. 22a; 1 of No. 23a; 65 of No. 37; 12 of No. 38; 4 of No. 38d; 2 of No. 48; 6 of No. 48a; 1 of No. 48b; 1 of No. 51; 1 of No. 52; 4 of No. 59; 1 of No. 63; 4 of No. 77; 2 of No. 103c; 1 of No. 103f; 2 of No. 125; 4 of No. 126a; 1 of No. 161; 1 of No. 185; 2 of No. 188.

The pistol shown in Figs. 2 and 3 can be built quite easily and requires only a

few parts. Small projectiles such as peas or marbles make excellent missiles and are muzzle-loaded into the barrel of the gun. Two Springs 1 mounted one each side of the barrel provide the propelling power.

It is best to start building the model by bolting two 5½″ Angle Girders 3 together overlapping their elongated holes to form a 5½″ channel girder. One Bolt passes from the inside through the fourth slots, and holds an Angle Bracket in position; another Bolt passes through the end holes and supports an Angle Bracket on the inside and a Double Bracket on the opposite side of the Angle Girders.

The firing piston is a 5″ Axle Rod 4, that carries a Collar at its front end. One of the Grub Screws in the Collar bears a nut that engages the end of a Pawl to hold the firing rod at full cock. The firing rod is passed through the Angle Brackets in the barrel of the gun and then through the centre hole in a Coupling. Each end of the Coupling carries a ¾″ Bolt that is used to support one end of a Spring, which is spaced from the Coupling by Washers. The other ends of the Springs are attached to ¾″ Bolts, one on each side in the fourth holes along the barrel. Five Washers are used to space each of the Springs from the Angle Girders.

A 3½″ Flat Girder 5 is attached to each side of the barrel by a Fishplate bolted in the fifth hole from the rear of the barrel. The other end of the Flat Girder is attached to one side of the Double Bracket. The Bolt used to attach the Fishplate to the barrel supports also a second Fishplate, which is attached to a Double Angle Bracket. This Double Angle Bracket is used to fix a 5½″ Strip 6 along the top of the barrel.

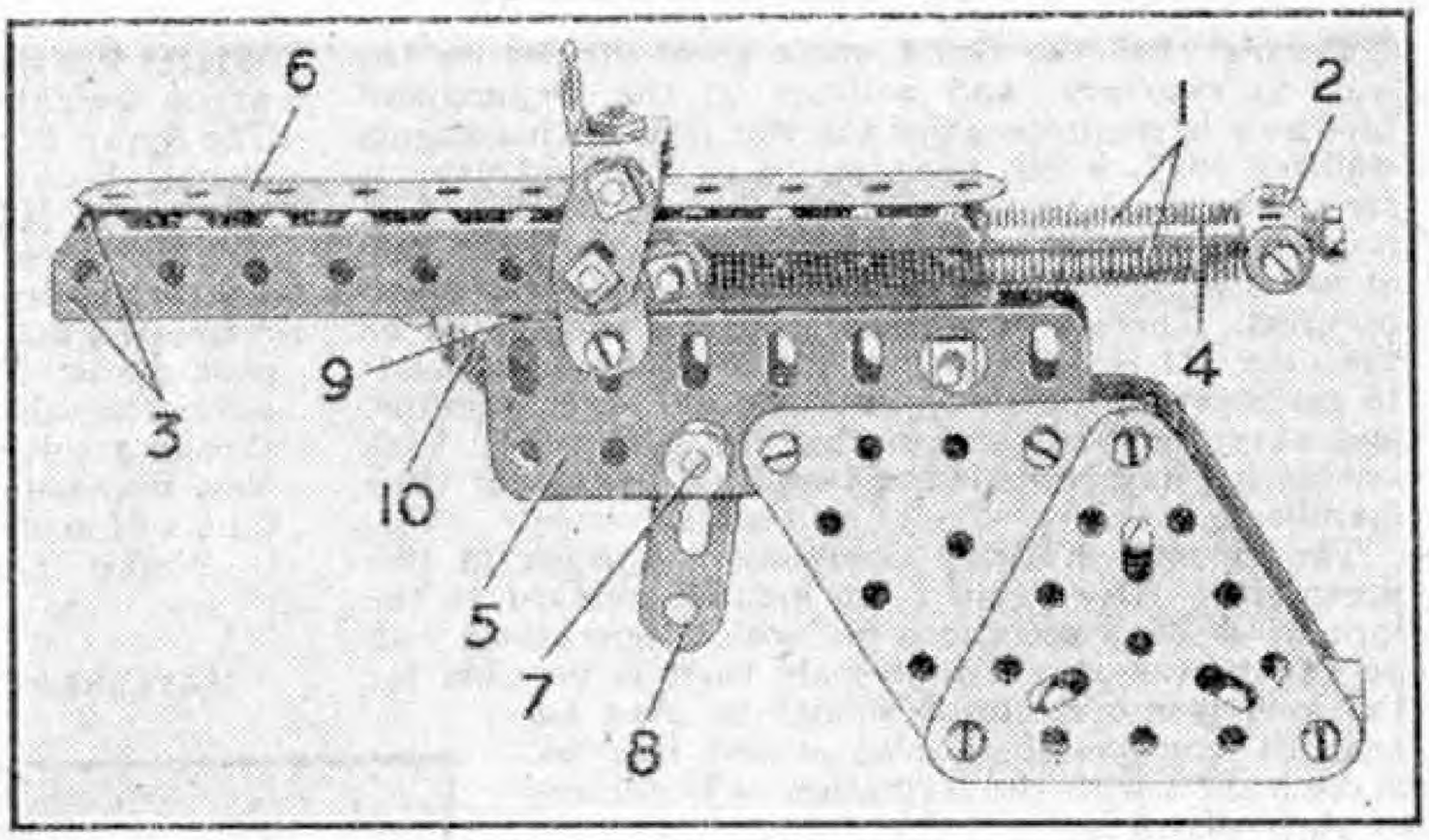


Fig. 2. A spring-operated pistol, which will "fire" peas and similar missiles.

A 1½″ Axle Rod 7 held in place with Collars carries a Boss Bell Crank 8, one arm of which acts as a trigger. A Pawl 9 is attached to the other arm of the Bell Crank and its point passes through the sixth holes in the underside of the Angle Girders forming the barrel. It is kept in position by a small piece of a Spring 10, which is fastened at one end by the Bolt that holds the Pawl in position. At its other end the Spring is hooked in the fourth holes in the Angle Girders.

The butt is made from four 2½″ Triangular Plates spaced by Double Brackets.

If properly constructed and adjusted the pistol will fire with a considerable degree of accuracy, and it is unnecessary to remind our readers we hope that the pistol should be used with care. For missiles, peas are best, but if these are not available in these days of "points," good substitutes are small pieces of wood shaped like bullets.

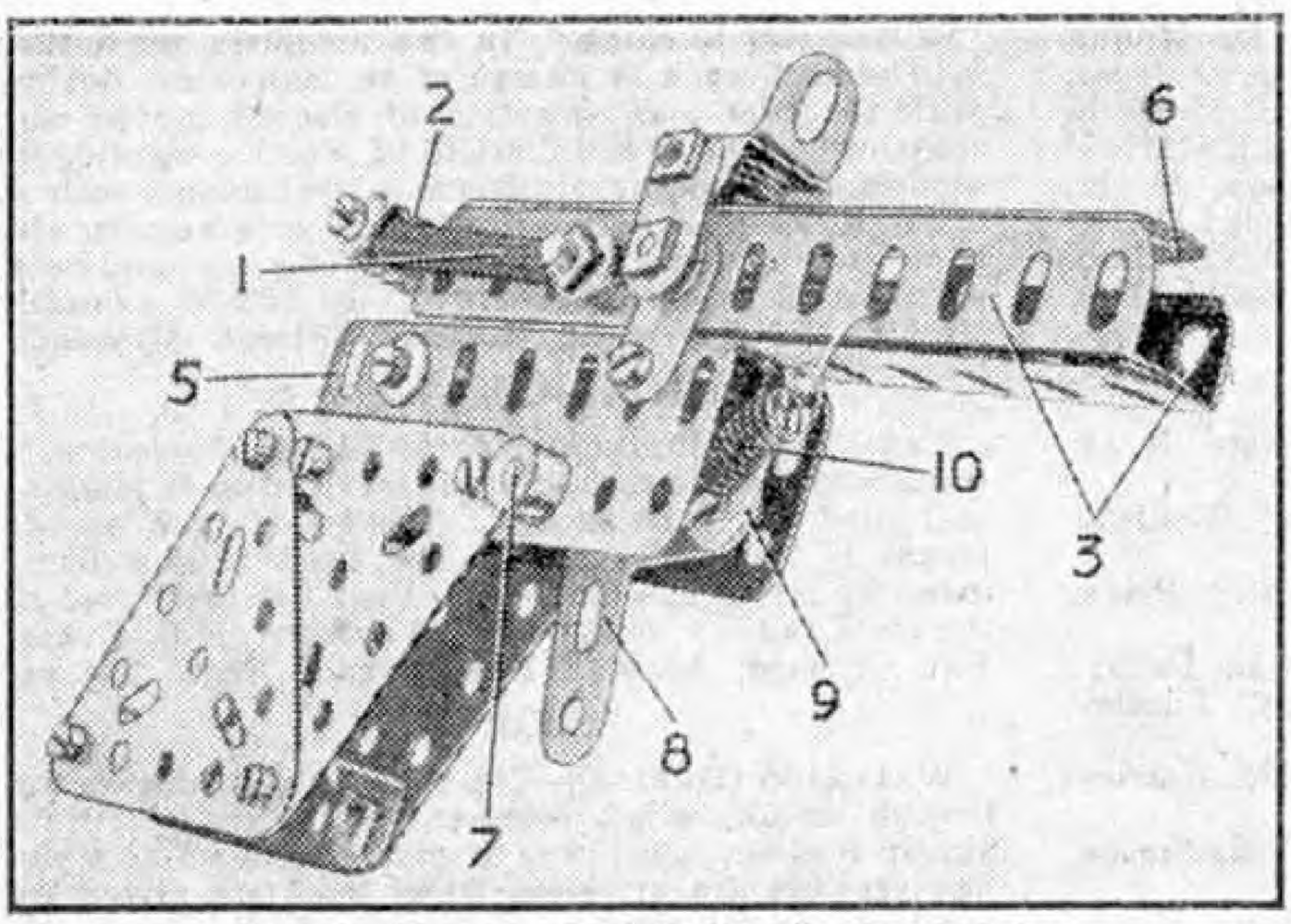


Fig. 3. Another view of the Meccano pistol.

Parts required to build the Pistol: 1 of No. 2; 2 of No 9; 4 of No. 10; 4 of No. 11; 2 of No. 12; 1 of No. 15; 1 of No. 18a; 23 of No. 37; 2 of No. 37a; 30 of No. 38; 3 of No. 43; 3 of No. 59a; 1 of No. 63, 4 of No. 76; 2 of No. 103d; 4 of No. 111; 1 of No. 128; 1 of No. 147.

Club and Branch News

WITH THE SECRETARY

During 1946 the Guild made great strides on the way to recovery, and activity in the Department just now is reminiscent of pre-war days. This augurs well for 1947, which promises to be a record year as far as the enrolment of new members is concerned. I hope that it will be a record also in the formation of new Clubs, and that existing Clubs will show equal progress. There is no reason why this should not be the case. It is only natural for Meccano enthusiasts to get together for model-building and other pursuits, and experience has shown that the Clubs they form are lasting and provide the best kind of fun for their members.

The Hornby Railway Company is sharing in this prosperity. Here again I am looking forward to the formation of associations in which operations can be carried on on a larger scale than is possible for the lone member, and I should be glad to hear of any members who would like to make a start with the formation of Branches in their districts.

SPECIAL MERIT MEDALLIONS

One indication of the progress made in 1946 is supplied by the nominations for the Special Merit Medallions that I have received for good work during last year. The number of these does not yet approach that of pre-war times, but it is very encouraging to find that during 1946 there were 25 members thought worthy of the award in those Clubs then active. More Clubs are now holding meetings, and I expect a considerable increase in the number of nominations during 1947. I appeal to Leaders of Clubs in which no use has been made of this award, the highest in the Meccano Guild, to keep it in mind. Two Medallions are available for each Club in each session, and are awarded for any good work on behalf of the Club or Guild.

Here is the list of Special Merit Medallions awarded during 1946: BOGNOR REGIS (Craigweil)—A. Davies, O. Davies; COVENTRY (Barkers' Butts Modern Boys' School)—D. Eyre, K. Hall, R. Lees, D. Munns; HUNTINGDON—M. Grimwood, R. Hibbin, G. Irons, G. Kemp, G. Maddox, P. Papworth, F. Saddington, P. Scrutton, O. Stephenson, T. Twigden; LEAMINGTON SPA (Hill Corner M.C.—J. Clarkson, H. K. Greenway, S. G. Hemming, V. J. Woodward; LIVERPOOL (Ranelagh M.C.)—J. M. Baker, J. W. Boldero, W. J. Jones, J. D. Lamb; NEW ZEALAND, CHRISTCHURCH—G. Thomas.

PROPOSED CLUBS

BECKENHAM—Mr. R. Sims, 194, Clockhouse Road, Beckenham, Kent.
BRACKWORTH—Mr. M. Atkinson, "Birtle," Westfield Road, Brackworth, Gloucester.
COVENTRY—Mr. F. J. Brown, 19, Chauntry Place, Off Hales Street, Coventry.
DERBY—Mr. H. Richards, 96, Osmaston Road, Derby.
GODALMING—Mr. G. F. Stevens, Hawley, Tuesley Lane, Godalming, Surrey.
HARROW—Mr. B. Gregory, 30, Dryden Road, Harrow Weald, Middlesex.
KILLINEY—Mr. L. McKay, "The Curve," Ballinclea Road, Killiney, Co. Dublin.
SHELDON—Mr. W. H. Blackford, 62, Elmay Road, Sheldon, Birmingham 26.

CLUB NOTES

PLYMOUTH M.C.—The Plastic Section formed this Winter has made excellent progress; plastic brooches, paper weights and other articles have been made. The Scrap Book Section held a Jumble Sale, at which games, books and magazines given for the purpose were sold. Club roll: 60. *Secretary:* D. M. Candy, 10, Whitefield Terrace, Lipson, Plymouth.

LONG ITCHINGTON M.C.—The Club Theatre has been converted into a Cinema Room, and an episcope has been made. The chief model constructed has been an electrically-driven crane about 3 ft. in height. A shocking coil made by members has given great fun. New upper-quadrant signals have been built for the Club's Hornby Train Layout. Club roll: 6. *Secretary:* G. Walker, Green End, Long Itchington.

AUSTRALIA

MAYLANDS M.C.—A new programme feature is "Salmagundi Evening." In this members are formed into groups, each in charge of an instructor, dealing with the care and operation of electric motors and transformers, the installation of electric lighting in models, the building of Meccano Mechanisms such as a car differential, etc. Fragments programmes also have been arranged. These consist of games and competitions, with refreshments. Club roll: 32. *Leader:* Mr. V. Malmgreen, 16, Kennedy Street, Maylands.

A football group of members of the Hornsea M.C., Leader, Mr. R. W. Shooter, Secretary, P. Hobson. This Club makes a special feature of outdoor sports, and has appointed D. Kitching as Sports Secretary.

BRANCH NEWS

CRAIGWEIL (BOGNOR REGIS)—After discussion a track was laid down and train services on it planned and tried out with success. The goods yard on the layout is to be electrified. The track is now being carefully relaid in sections. A Visit has been paid to the local railway goods yard. *Secretary:* J. S. Evans, Two Orchard, Aldwick Bay, Bognor Regis, Sussex.

EIRE

WATERLOO (DUBLIN)—The running of trains on the Branch layout, which represents the Kent and East Sussex Railway, continues in good workmanlike style. Bus services are arranged when lines are closed by accidents or for repairs. *Secretary:* S. B. Carse, 38, Oakley Road, Ranelagh, Dublin.

The Surroundings of a Dublo Railway

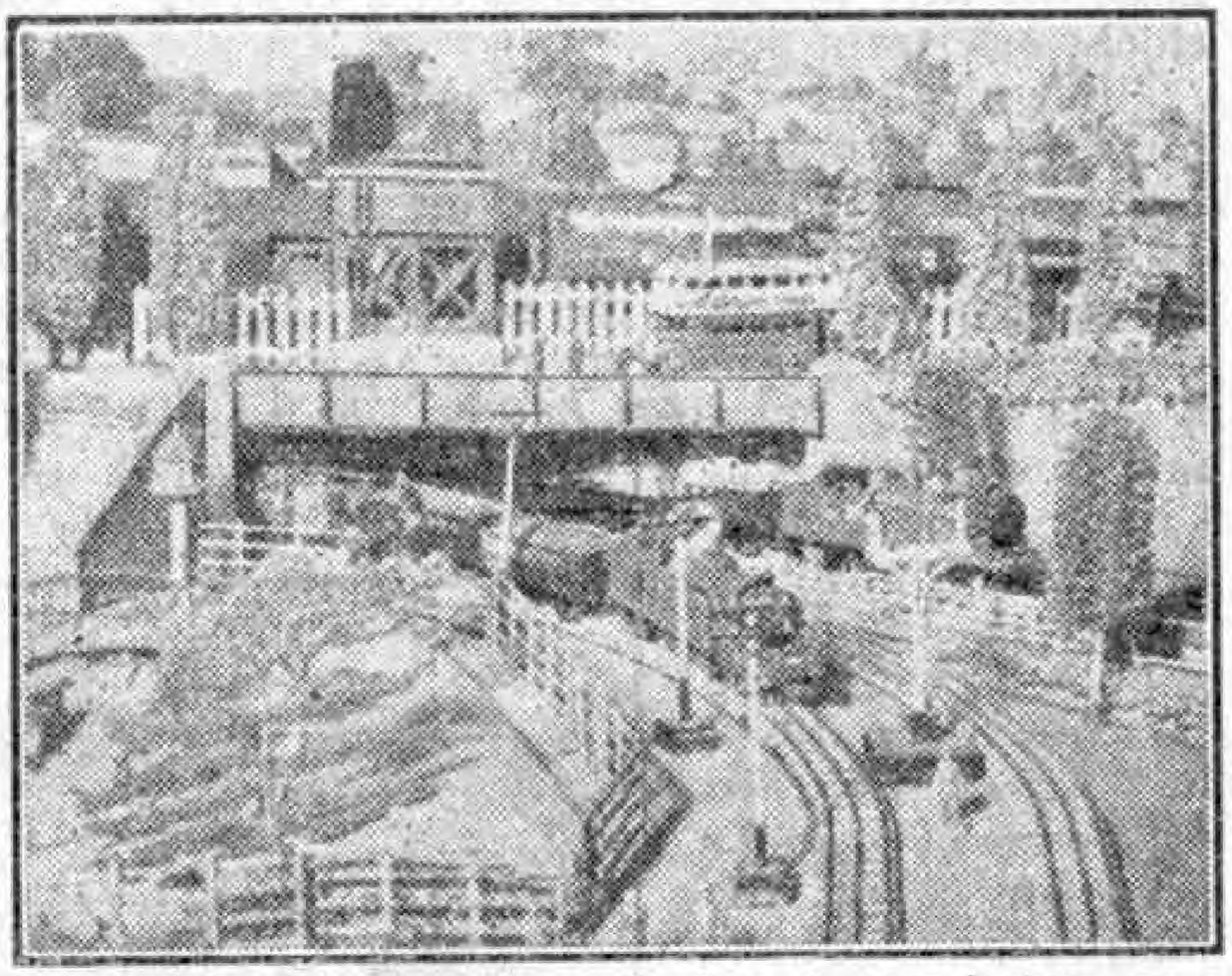
THE fun of running a Hornby Dublo Railway or indeed any other miniature railway is greatly increased if the trains run among the correct surroundings. A plain track is never very convincing, however satisfactory it may be from the running point of view.

Stations, signal cabins and signals usually are included in the first accessories to be added to a system, as these are really essential to the working of the traffic. Having provided these, the miniature railway owner still finds the general appearance of the system somewhat bare. There is plenty of railway, but little else; the surroundings that help to make up the area which the railway is supposed to serve are missing.

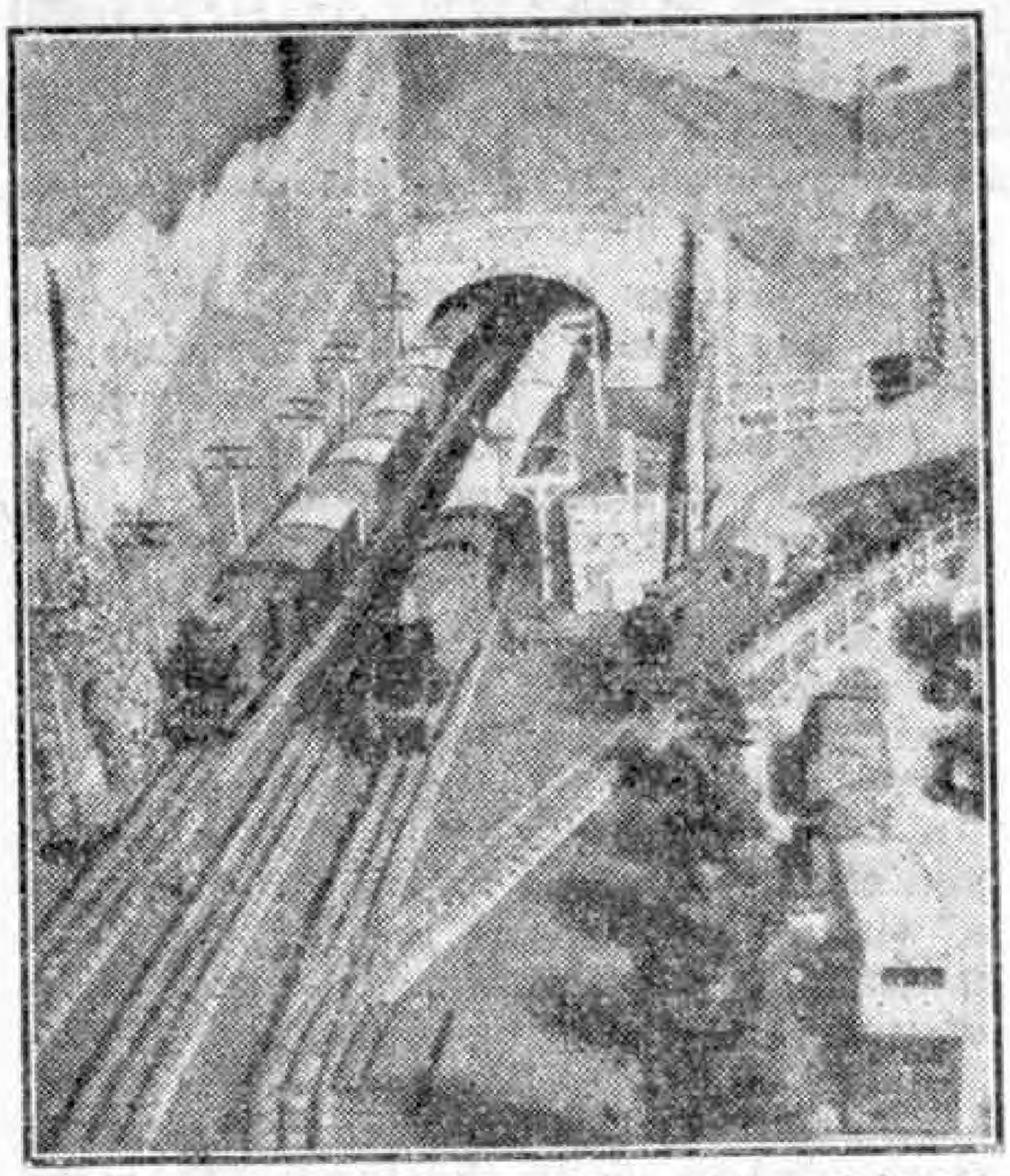
How to provide lineside items that will help to give the layout something of a real atmosphere will depend to a certain extent on the nature of the line. A permanent system naturally is better suited to the inclusion of actual scenic details, although much can be done to improve the ordinary portable or temporary line in various ways. As a rule it is not possible, for instance, to provide background scenery on a temporary layout; but many other lineside effects can be arranged. They will be cleared away when the layout has to be packed up again, but in this respect they are no different from stations and similar items of "railway" character. On a permanent layout they are simply left in position all the time. In general design and detail therefore, additional buildings and structures may well be the same for either type of layout.

Most, if not all, of the additional lineside features that we wish to provide will have to be made at home. Fortunately, it is not difficult to obtain satisfactory effects with simple materials, and now and again we may come across some item in a toy shop or store that can be pressed into use on the layout, in spite of the fact that it has not been intended originally for this purpose..

If we are fortunate enough to have some of the miniature Trees and Hedges that used to be made for Hornby Railways, we can very well employ these on our Dublo system. The accompanying photographs showing parts of the Dublo layout that was described in these pages in the December 1946 "*M.M.*" provide a good instance of the use of Hornby and other accessories. If we have no ready-made trees or hedges and so on, and wish to make our own, we shall probably have to experiment a little. The "growing" of miniature trees is rather a trying business, but after a few attempts it is often possible to obtain quite pleasing effects with the aid of twigs, cotton wool, glue and paint, and a lot of patience.



An attractive arrangement of scenic and other features on a Dublo layout. The photographs on this page show parts of the system of Mr. E. Dadstone, Guildford.



Effective use of a miniature hill and tunnel in conjunction with a scenic background and other lineside features is well shown in this illustration. Note the Dinky Toys road traffic on the right.

Fortunately the making of other lineside items is considerably simpler. Fencing can be made from thin wood or even from cardboard, the exact method of use depending on the type of fence adopted. When neatly made and painted, even cardboard fencing adds a great deal of effect, as it separates the railway property from the surroundings and also helps to avoid the confused results sometimes seen on layouts.

Similar methods, but perhaps a little more developed, can be employed to turn out huts, sheds or even warehouses required on the railway, and from these it is an easy matter to switch over to the making of miniature houses or shops. In many cases the basis of the job can very well be a cardboard box of suitable shape and size. Roofs, chimneys and other details can be added and after marking out such features as doors and windows, the whole can be painted or, if preferred, finished off by means of the printed brick, slate and other building papers that can be obtained from many hobby shops. Variations in finish can be introduced to suit the ideas of the individual model railway owner, and will prevent any suggestion of "sameness" all along the line.

Bridges and tunnels can be made up too and although these are most effective when arranged in conjunction with the scenic features on a permanent layout, there is no reason why they should not be quite pleasing on a temporary line.

A Hornby Clockwork Railway

Some Hints for Beginners

IN this article we give a few hints that we hope will prove useful to readers who have recently become owners of a Hornby clockwork train set.

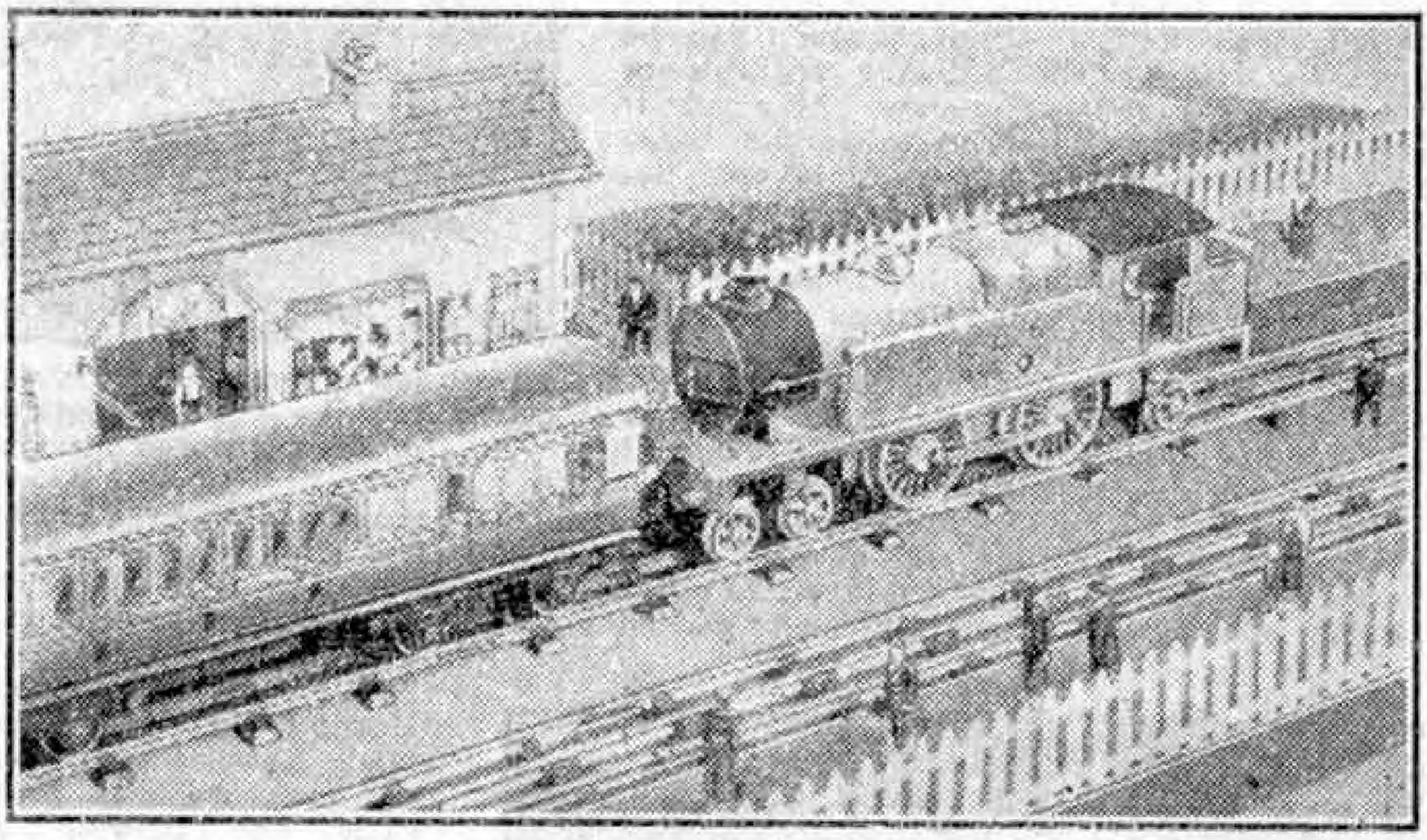
First of all it is obvious that the track must be laid on a level surface. A table top is the best, but very often the only table available is not big enough. The alternative is usually the floor, and this is fine for the purpose so long as there is a good stretch of carpet or lino. It is not fair to expect a small train to travel well over rugs or mats.

Special Connecting Plates or Clips are supplied with the set and these must be fitted between the rail ends according to the instructions, otherwise the rails may work apart during running operations, with perhaps the result of a realistic derailment.

Our train must have somewhere to begin and end its journey, and of course a Hornby Station provides this point in the best possible way. If we have not yet acquired a station, however, a good substitute can be provided by a cardboard box lid or even a couple of books. Of course a little imagination is required to turn such a substitute into a station, but imagination must always play a part in model railway working, even when we have quite a lot of equipment.

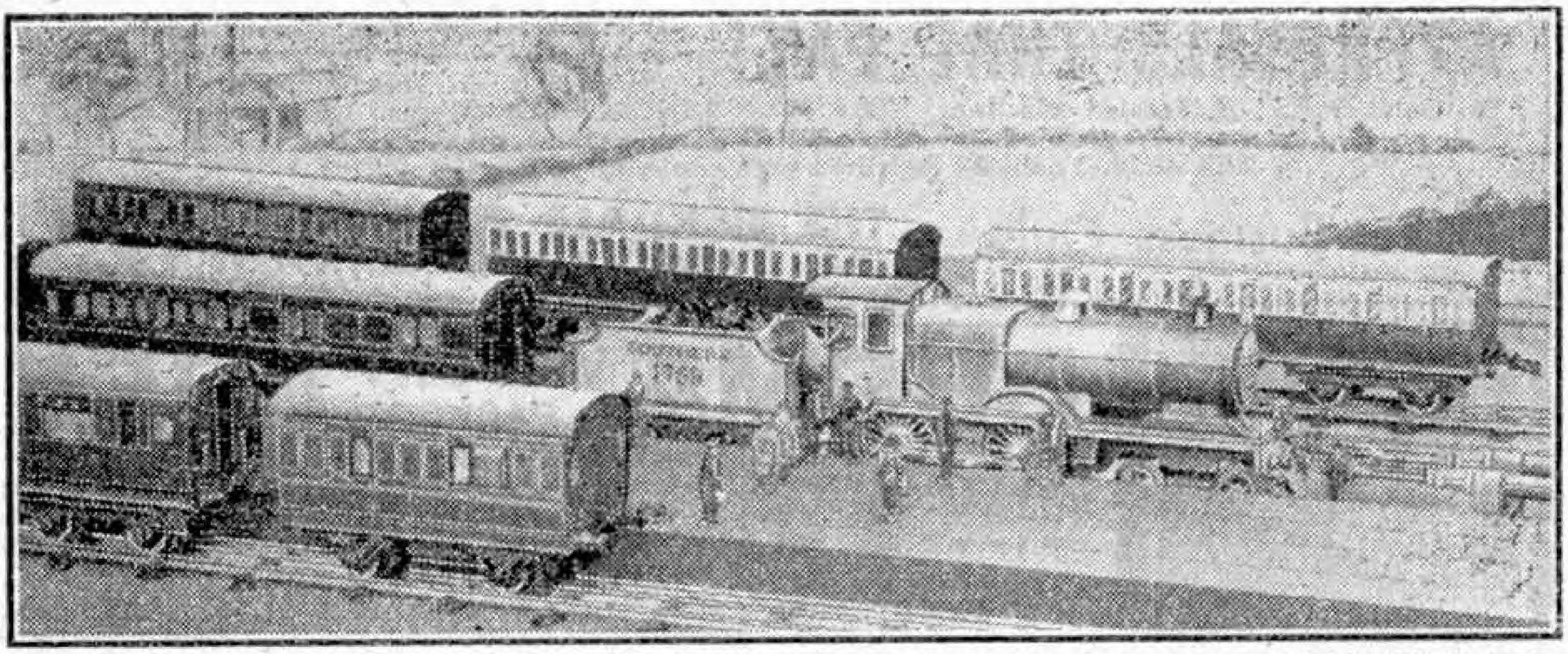
Put the engine and coaches or wagons on the track by the side of the station and couple them together. Hold the engine in the left hand and apply the brake by means of the brake rod or lever. Then push the key on to the winding shaft as far as it will go. Wind in a clockwise direction and continue turning until the spring is fully wound. Note the number of turns required for a full winding, and for regular use always give one turn less than the full number. This will avoid strain on the spring and possible overwinding. After winding, remove the key and, still holding the engine, take off the brake. Release the engine and away goes the train.

To get the most realistic results, the train should come to a halt, after its journey, exactly at the station. At first it probably will not do this and here some interesting experiments are called for. Instead of winding up the engine to the full, find out by trial how many turns of the key will bring the train to a stop at the station after one complete run round the track. Then do the same for two runs, or three. By remembering these numbers and using them as required, we can keep our train under control.



A stopping train on a Hornby layout with an L.N.E.R. 4-4-2 Tank Locomotive running bunker first.

The working parts of the engine should be oiled at intervals of a few weeks and also the axles of the rolling stock. Thin oil of good quality such as is used for sewing machines is suitable and only a very small amount of it must be used. An ordinary oil-can gives too much oil and the best plan is to apply the oil with a wire dipper or the pointed end of a matchstick. Too thick oil or too much of it is liable to prove worse than no oil at all. Take particular care not to let oil get on to the wheels of the engine or rolling stock, and so on to the track. To make sure that the track is clean, wipe it over thoroughly from time to time with a clean dry cloth.



A country terminus on a Hornby layout. The Hornby S.R. "L1" class engine has just arrived with its train. Note the figures on the platform.

The "*Castleford and Darlington*" Hornby Railway

THE "*Castleford and Darlington Railway*" is a Hornby Gauge 0 system operated by our reader John S. M. Measures, of Uppingham.

The best way to follow the layout and its operation will be to take an imaginary trip as described in the owner's own words:

"Our train leaves platform 1 at Castleford. Drawn up alongside the platform behind an M3 tank locomotive are five coaches which, in order from the rear, are an N.E. non-corridor coach, a N.E. corridor, two No. 2 Special Pullmans and another N.E. corridor. Backing down on to the front end is a No. 2 Special clockwork tender locomotive of the Southern 'L1' type. This being coupled up, the *'right away'* is given and we draw out of the station over the trailing points and take a curve on to the main line; gathering speed we pass Hollington and attack the climb up on to the viaduct leading to Castle Lipton.

"Reaching the summit at Castle Lipton station we gather speed down the next straight and take the facing crossover before Amhurst and so come to a halt in Amhurst station. The rear coach is detached and with the 'L1' exerting her full power, we start straight up the gradient on to the Oakley viaduct; we breast the summit just past Oakley and rush down past the place where Darlington station is being constructed on the right-hand side. This station is as yet uncompleted, and we make another circuit off the main line and at last come to rest again at Amhurst which, for the time being, takes the role of Darlington. The coach which was detached at Amhurst is worked forward as part of a stopping train later.

"The locomotives on the railway number six. Pride of place is taken by a middle-aged Hornby No. 2 Special 'L1' class 4–4–0, still numbered A759. Then comes a G.W.R. 'County' and an aged Hornby No. 2 locomotive in L.N.E.R. colours. There are two No. 1 Special tender engines and last, but not forgotten, is the sturdy little M.3 tank locomotive employed on local duties.

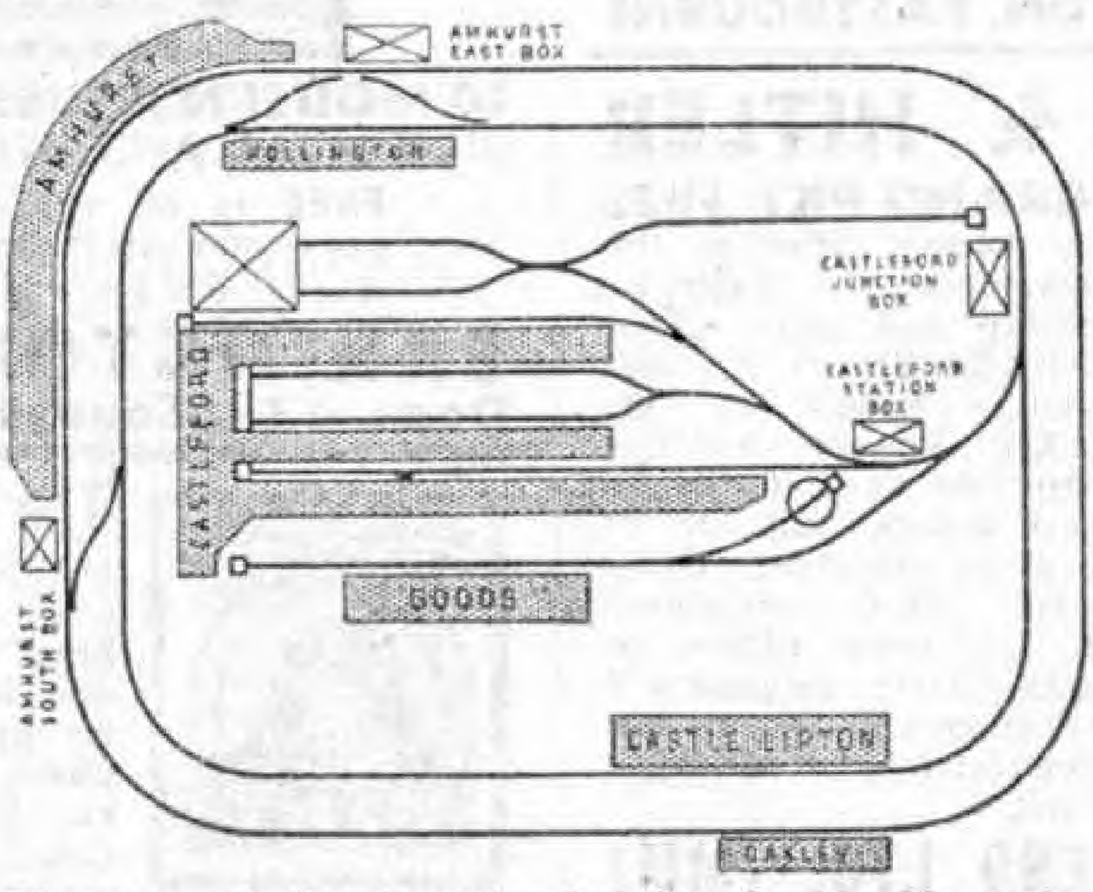


Diagram of the layout of John S. M. Measures, Uppingham.

For other Stamp Advertisements see also pages 90 and xi

Stamp Collecting

Fields for Specialising

By F. Riley, B.Sc.

THE average beginner in stamp collecting is satisfied to accumulate stamps so that he can show a well-filled album. As the album is usually of the general type, this means that he sets out to collect the stamps of the world, a truly enormous task. There is no reason why he should not begin in this way, however, and indeed it is probably by far the best, especially for a young collector, for it teaches him to know his way about the stamp world; but sooner or later he will begin to interest himself in some particular corner. For instance, he may be attracted by a special country, and in that case he will pay special attention to its stamps, collecting as many as he can and, what is more important, studying them more carefully than the general stamps with which he began his collecting career.

There is real wisdom in specialising in this limited way. It may eventually bring the collector to varieties of perforation or shade, flaws, errors, re-entries and other details in which the advanced stamp expert revels. It is not given to every one of us to reach this stage, but there is good fun and real interest in the more restricted form of specialisation that I have suggested.

Let us look a little further into this. Specialisation need not be restricted to a choice of countries; it can well be based on design, and modern stamps lend themselves well to collecting of this kind. For example, a reader may have a special interest in bridges, and naturally he looks for stamps that picture these structures. It is surprising to find how many stamps of this kind there are. Every "*M.M.*" reader who is a stamp collector knows the Australian stamp on which there is a representation of the Sydney Harbour Bridge; and the Quebec Bridge, which has the longest cantilever span in the world, has been featured on an equally familiar Canadian stamp. Another example is reproduced on this page. It shows the very modern Jinja Bridge across the falls that mark the flow of the Nile from Victoria Nyanza. A more primitive bridge is shown on a stamp from the French Cameroons, and between these extremes there is a large range of stamps to include in a bridge collection.

It is easy to think of other subjects for special collections. Most of us are interested in animals and a natural history stamp album would give us real pleasure. Here again there is no shortage of examples, and two of the stamps that would naturally go into such a collection are reproduced here. Native customs and national costumes are other subjects that provide ample scope while in addition there are shipping, transport by land, including both road and rail, exploration, the development of the aeroplane, and mountaineering. Great men provide another fine subject that offers really extensive opportunities. The number of portraits of famous men that have appeared on stamps is surprising, while the interest is unlimited.

The last-mentioned topic leads us to the consideration of the display of specialist stamps, for naturally details of the careers of the men whose portraits are shown calls for some writing up. Some time ago I had the pleasure of looking over a record of portrait stamps, and of the men commemorated by them, that had been compiled by a reader of the "*M.M.*" This reader had written brief notices of the individuals concerned, giving dates and outlining their chief achievements, and the sum total of his efforts, although he had taken pains to be concise, amounted almost to a book. He had indeed given his work the form of a dictionary of stamp biography, with the subjects dealt with in alphabetical order.

A splendid way of adding to the attractions of a specialised collection is to use photographs or cuttings to illustrate the stamp designs included. For instance, if bridges are the subject of the collection, then on the same page as the stamp or group of stamps showing a particular bridge there could be mounted one or more photographs of the actual structure. Cuttings from newspapers or magazines can be used if photographs are not obtainable, or are not of suitable size, and in some cases the collector can make good use of drawings, particularly to illustrate details of particular interest.

Illustrations of this kind extend and brighten up a specialist collection in the most remarkable way. I have seen examples in which ship stamps have been treated in this manner, and the effect was really excellent. Each sheet was devoted to a particular vessel, or to a type, and explanatory notes were given in addition to titles. The display in each case was carefully planned to show stamps and illustrations to the best advantage, and to provide variety as the pages of the collection were turned over. Such a display gives pleasure to the collector and delight to all who have the privilege of looking over it.

Needless to say, a loose leaf album is the best if a subject collection is to be made, whether this is to be extended and embellished by illustrations or not. The elasticity that a loose leaf album provides is essential, and this type has the further advantage that with it there is no excuse for overcrowding, always a fatal error.

For other Stamp Advertisements see also pages 88 and xi

Stamp Gossip
and Notes on New Issues

By F. E. Metcalfe

INTEREST in the "Victory" issues is getting more intense than ever. Prices are hardening all the time and they look like going up further quite rapidly, so even yet it is not too late to buy. As well as the "Victory" stamps, there are this month the stamps to be issued by South Africa and South African colonies in honour of the Royal Family's visit to that part of the world. As these various sets are only going to have a very short life they should be snapped up as quickly as they are offered.

The writer of these notes has recently returned from a visit to Austria and Hungary. These two countries have a very large number of collectors, but about all the majority of them are able to buy are the numerous new issues that their respective post offices produce for them. Orders from abroad are no doubt welcomed, for both countries are desperately poor at the moment, but it is mostly for home consumption that all their new stamps are issued. Whatever one may think of the value of these as an investment, and Austrian and Hungarian collectors themselves appear to be well satisfied on this point, if one is to judge by the quantity they buy, there can be no two opinions about their beauty, and they are cheap enough, so their collection is easy for those interested. By all means collect these modern stamps if you like them; one can ignore the croakers, for they are just as much postage stamps as any others.

There is one country which we don't like much at the moment, however, and that is Belgium. Hitherto it was a favourite of ours, but latterly the selling of many of its stamps has looked like a racket. All this business of buying stamps only by subscription before they are issued, and the fantastic so-called charity premiums over face are sickening many hitherto staunch collectors, and these stamps are going to have a very nasty fall before long.

It's a nice change to leave Belgium and refer to the new values recently issued of our own colonies, notably the 10d. of Bahamas, the 8d. of Barbados, and the 1/3 of Gambia. The Gambian stamp was a surprise to most people. It has been issued ostensibly to cover the 1/3 air mail rate, but this rate is expected to be changed any time in the near future, for it is frankly an impositiou to charge such a sum for a letter not exceeding ½ oz. in weight. So it behoves collectors to get their copies while the stamp can be obtained at the current rate.

There is a good deal of controversy about the stamps which were issued or overprinted by the Japs during their occupation of British territory in the Far East. Gibbons have announced their intention to list many in the forthcoming Part 1 of their catalogue. The so-called "Peacock" overprints of Burma are the chief bone of contention, and we have been asked by many what we personally think about them.

Well, we will be frank. We consider that Gibbons are perfectly justified in listing them in the way they propose to do, but if anybody thinks that they are going to be able to buy them at to-day's high prices—some cost pounds already—and to sell them at a profit at some time in the distant future, when their novelty has worn off, they are making the mistake of their lives. If you wish to collect these stamps for pleasure, and they are interesting enough, by all means do so, but that is all there can be to their collection. After all, that's about all there should be to the collecting of stamps.

A subject which has been causing misgivings to collectors of modern Russian stamps was the rumour that the post office concerned was preparing to reprint all stamps issued during the past 25 years. This story is now denied, but it may never be known if originally there had been that intention until the outcry of collectors made the Russians realise how stupidly they would be acting if they did anything of the kind. We have never liked modern Russian stamps, for they never seemed anything more than pretty labels, but they were popular enough, particularly in the U.S.A.

Two stamps which got many collectors guessing were the provisionals of Trengganu issued in 1941. The few which were offered during the war sold for as high as four pounds a pair. When we returned to Malaya in 1945 stocks were found and the price dropped considerably; the editor of one magazine stated that actually large stocks were held in Singapore and that their real value was only a shilling or two. Time alone can tell which is right, but it is significant that wholesale prices from the Far East have hardened considerably.

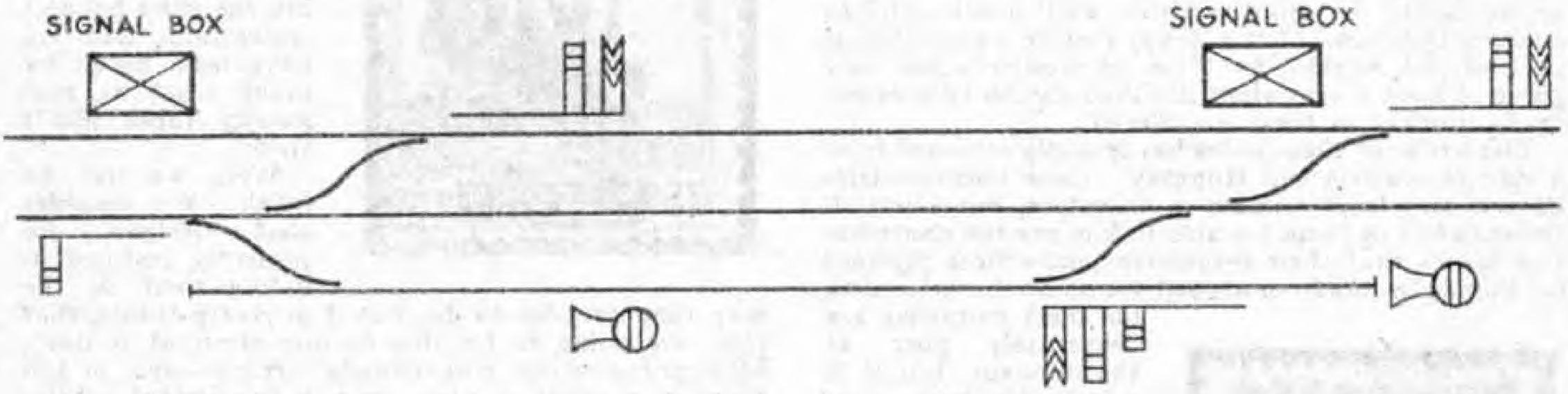
A collector has asked the writer of these notes why modern stamps of Switzerland cost so much over face even when they are current. It's a question of who considers what in the way of face value. The official rate for the Swiss franc is about 17 to the pound but the postal nabobs think that less than half that is the real value of the pound. There have been British dealers misguided enough to accept these stamps at Swiss valuation, although there is nothing special about any of them from any standpoint. Our advice is leave them severely alone at present.

This month's tip. Southern African stamps issued to commemorate the Royal Family's visit

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

What is Wrong with these Signals?



Most of us are delighted to find mistakes when others have made them, and to allow *"M.M."* readers an opportunity of exercising this amiable weakness a railway enthusiast has perpetrated the track layout reproduced on this page. There is nothing wrong with the track itself, but the signals are decidedly in the wrong places, and in some cases the positions of the arms on the signal posts are all wrong. Can you put these things right?

What competitors are required to do in this contest therefore is two-fold. First they must correct the positions of the signal arms, and then they must move the signals themselves to the places in which they should be.

As usual there will be two sections, for Home and Overseas readers respectively, and in each there will be prizes of 21/–, 15/– and 10/6 for the best entries in order of merit, with consolation prizes for other deserving efforts. If there is a tie for any prize the judges will base their decision on neatness and originality.

Entries must be addressed *"February Signalling Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing date in the Home Section, 31st March; in the Overseas Section, 30th September.

Make Your Own Choice Here

This month we again give readers opportunities of displaying their skill in drawing. In the contests of this kind that have been arranged in recent months the subjects themselves have been specified, and have covered an interesting range of transport methods. Now we give readers themselves the choice, for they can send in drawings of any kind, dealing with any type of subject.

It will be seen that no reader has any excuse for not sending in an entry, for he can select whatever suits him best. If he is most interested in motor cars, lorries, aeroplanes, trains or ships, he can send us his best drawing covering his favourite subject. Those who are fond of animals and have often tried their skill in making drawings of them, can now make good use of their efforts, and the competition is open also to those who prefer drawing buildings or scenes, in the city or country. There is no restriction in regard to colour, but competitors must bear in mind that it is the merits of an entry as a drawing that will count most. Gorgeous colouring will not compensate for bad drawing, but the use of colour to set off a good drawing will be recognised by the judges.

There will be the usual two sections, for Home and Overseas readers respectively, and in each the best entries will be awarded prizes of 21/–, 15/– and 10/6 in order of merit. If there are other entries that are deserving of recognition they will be awarded Consolation Prizes.

Competitors must take care to write their names and addresses on the back of each sheet of their entries. These should be sent in envelopes or wrappers addressed *"February Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13."* The closing dates are 31st March in the Home Section, and 30th September in the Overseas Section.

February Photographic Contest

This month's photographic contest is the 2nd of our 1947 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed: *"February Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be separate sections for Overseas readers, and in each section prizes of 15/– and 7/6 will be awarded. Closing dates: Home Section, 28th February; Overseas Section, 30th August.

Competition Results and Solutions

HOME

DECEMBER 1945 DRAWING CONTEST

1st Prizes, Section A: A. Reeve, Melton Mowbray; Section B: A. F. Timms, Birmingham 27. 2nd Prizes, Section A: P. Lillywhite, London E.18; Section B: S. Gorman, Letchworth. 3rd Prizes, Section A: J. C. Teasdale, Stafford; Section B: K. Sparks, Smethwick 41. Consolation Prizes: K. Renshaw, Sheffield 2; B. Chapman, London E.11; D. B. Jennings, Sandbach; P. Hancock, Edinburgh 10; D. J. Wilks, Beaconsfield; P. Tilbrook, London N.13; I. W. Cooper, London W.4.

DECEMBER 1945 PHOTOGRAPHIC CONTEST

1st Prizes, Section A: G. Gemmill, Burnley; Section B: P. Miller, Stockton-on-Tees. 2nd Prizes, Section A: L. A. C. Atkins (R.A.F.), Eccles; Section B: G. Evans, Neath. Consolation Prizes: D. Devereux, Maesteg; J. A. Fitchett, Bolton; B. Palmer, Merthyr.

DECEMBER 1945 ADVERTISEMENT LETTER SQUARE

1st Prize: D. Welsford, Staple Hill. 2nd Prize: K. B. Fenton, Wembley. 3rd Prize: K. Hewland, Hull. Consolation Prizes: H. Boyd, Belfast; J. Kenny Glasgow S.W 2; T. Hill, Bolton.

JANUARY 1946 PHOTOGRAPHIC CONTEST

1st Prizes, Section A: F. G. Reynolds, Sidcup; Section B: W. Crosland, Leeds. 2nd Prizes, Section A: C. A. Reader, London S.W.18; Section B: J. McCoy, Waterford. Consolation Prizes: G. F. Carter, Derby; N. J. Bennetto, Tettenhall; J. W. Foulger, Birmingham 9; B. Chulindra, Bodmin.

JANUARY 1946 LOCOMOTIVE CONTEST

1st Prize: C. E. Wrayford, Bovey Tracey. 2nd Prize: T. J. Mockridge, Taunton. 3rd Prize: R. J. Perrin, Ilford. Consolation Prizes: P. Anderson, East Molesey; J. L. S. Balfour, Edinburgh 4; A. Reeve, Melton Mowbray.

JANUARY 1946 COVER VOTING CONTEST

1st Prize: M. R. Berry, Horley. 2nd Prize: R. Burge, Hull. 3rd Prize: D. Prynn, Exeter. Consolation Prizes: F. P. Guyther, Chiswick; N. Flooks, Christchurch; P. Marshall, Robertsbridge.

FEBRUARY 1946 "GO AS YOU PLEASE" CONTEST

1st Prize: R. Parkerson, Great Yarmouth. 2nd Prize: Master Barry, Hebden Bridge. 3rd Prize: A. W. Marsh, Coventry. Special Consolation Prizes: H. Davies, Hove; J. S. Clarke, Galashiels; R. D. Goodridge, Clacton-on-Sea. Consolation Prizes: J. Sinclair, Hamilton; J. Mathews, Bradford; K. R. Pargeter, Stourbridge; H. T. Lyons, London E.17; J. D. Ellenger, Guildford; N. Farnell, Preston; P. Boardman, Blackpool; J. S. Box, Arnside.

APRIL 1946 CROSS NUMBER PUZZLE

1st Prize: J. J. Nesbitt, Manchester 21. 2nd Prize: R. P. Walford, Bovey Tracey. 3rd Prize: A. Elvey, London S.E.9. Consolation Prizes: G. L. Davies, Manchester 21; J. O. Wagstaff, Luton; J. Webster, London S.W.18; D. A. Kent, Coulsdon.

APRIL 1946 DRAWING CONTEST

1st Prize: M. Cornes, Widnes. 2nd Prize: P. Hancock, Edinburgh 9. 3rd Prize: P. O. Brown, Westcliff. Consolation Prizes: G. Vernon, Cambridge; A. Timms, Birmingham 27; J. C. Teasdale, Walton; A. Reeve, Melton Mowbray; K. R. Pargeter, Stourbridge; D. Warner, Kineton; R. O. Macdemitria, Hove 3; P. H. Bretherton Kirkby; R. A. Williams Southall.

OVERSEAS

JANUARY 1946 PHOTOGRAPHIC CONTEST

1st Prizes, Section A: J. A. Roberts, Durban, S.A.; Section B: N. A. McDougall, Victoria, Canada. 2nd Prizes, Section A: A. Brand, Transvaal, S.A.; Section B: T. C. Prestwick, Christchurch, N.Z. Consolation Prizes: R. Edge, Johannesburg, S.A.; A. Benjamin, Germiston, S.A.

JANUARY 1946 COVER VOTING CONTEST

1st Prize: K. W. Dey, Hamilton East, N.Z. 2nd Prize: A. Brand, Germiston, S.A. 3rd Prize: B. J. Ivory, Rangiora, N.Z. Consolation Prize: M. Smith, Riversdale, N.Z.

FEBRUARY 1946 "GO AS YOU PLEASE" CONTEST

1st Prize: K. Boocock, N. Canterbury, N.Z. 2nd Prize: E. C. Stonyer, Meadowbank, N.S.W. 3rd Prize: G. T. Dey, Hamilton, N.Z.

MAY 1946 PHOTOGRAPHIC CONTEST

1st Prizes, Section A: L. W. Humm, Geraldine, N.Z.; Section B: F. K. Lyons, Delhi, India. 2nd Prizes, Section A: C. L. Williams, Port Said, Egypt; Section B: G. Rodgers, Lisbon, Spain. Consolation Prize: C. J. Ricketts, Potchefstroom, S.A.

SOLUTIONS

JANUARY 1946 LOCOMOTIVE CONTEST

1. "*Yorkshire*" L.N.E.R. D49 4-4-0 No. 234 (Now 2700). 2. "*Orion*" L.M.S. 5 X P 4-6-0 No. 5691. 3. "*Somme*" L.N.E.R. D11 4-4-0 No. 5503 (Now 2667). 4. "*Lyonnesse*" S.R. "King Arthur" 4-6-0 No. 743. 5. "*Lady of the Lake*" G.W.R. "Saint" class 4-6-0 No. 2902. 6. "*Green Arrow*" L.N.E.R. V2 2-6-2 No. 4771 (Now 800). 7. "*Seaview*" S.R. 0-4-4 Tank No. W.17. 8. "*Kenilworth Castle*" G.W.R. 4-6-0 No. 4097. 9. "*Lloyds*" G.W.R. "Castle" class 4-6-0 No. 100A.1. 10. "*Manna*" L.N.E.R. A3 4-6-2 No. 2596 (Now 85). 11. "*Malvern*" S.R. V Class 4-4-0 No. 929. 12. "*Knight of the Thistle*" G.W.R. "Star" class 4-6-0 No. 4012. 13. "*Sansspareil*" L.M.S. 5 X P 4-6-0 No. 5732. 14. "*Samson*" L.M.S. 5 X P 4-6-0 No. 5738. 15. "*Shovell*" L.M.S. 5 X P 4-6-0 No. 5651. 16. "*Juno*" K.E.S.R. 0-6-0 No. 9.

APRIL 1946 LOCOMOTIVE CROSS-NUMBER PUZZLE

London's Airports—(*Continued from page 56*)

yet completely evacuated and some Transport Command "Dakotas" still fly from here, but the large camouflaged Service hangars are now used by B.E.A. for maintenance work, which makes Northolt a completely self-contained unit.

Compared with the present accommodation at Heath Row and Northolt, Croydon is quite luxurious. We parked our car in the large forecourt and entered the roomy reception hall with its deep comfortable armchairs and settees, and its office counters round the four walls bearing the names of British and foreign airlines and charter companies. Here was a touch of the old British pre-war airline luxury, with a post-war touch in the shape of metal counters recently made by R.A.F. personnel from panels taken from old aircraft, and smart polished ash-trays made from bomb-cases and pistons. We passed through the passenger arrival and departure rooms and the famous control tower with its tall radio spire, and out on to the airfield.

The first thing we saw was a very old friend in the form of a Junkers 52 transport — a well-known pre-war visitor. They would not have been very popular in 1940, for the Ju.52s were Germany's standard paratroop transport. However, this one was peaceful enough and belonged to the Czech Air Force. Near by was a "Dakota" that had recently brought the Czech foreign minister to London, and a string of other "Daks" belonging to Sabena and B.O.A.C. Over to the right were the large hangars used by B.O.A.C. for repair work, and outside these were parked some "Lancastrians." To the rear of these were the hangars used by the charter companies, with several Railway Air Services' Avro XIXs, a Westminster Air Service "Rapide" and a large collection of "Austers," "Proctors" and "Consuls" belonging to other charter firms. Finally on the tarmac were several more "Dakotas," two "Yorks" and another "Lancastrian." There was no doubt at all that Croydon was still very busy.

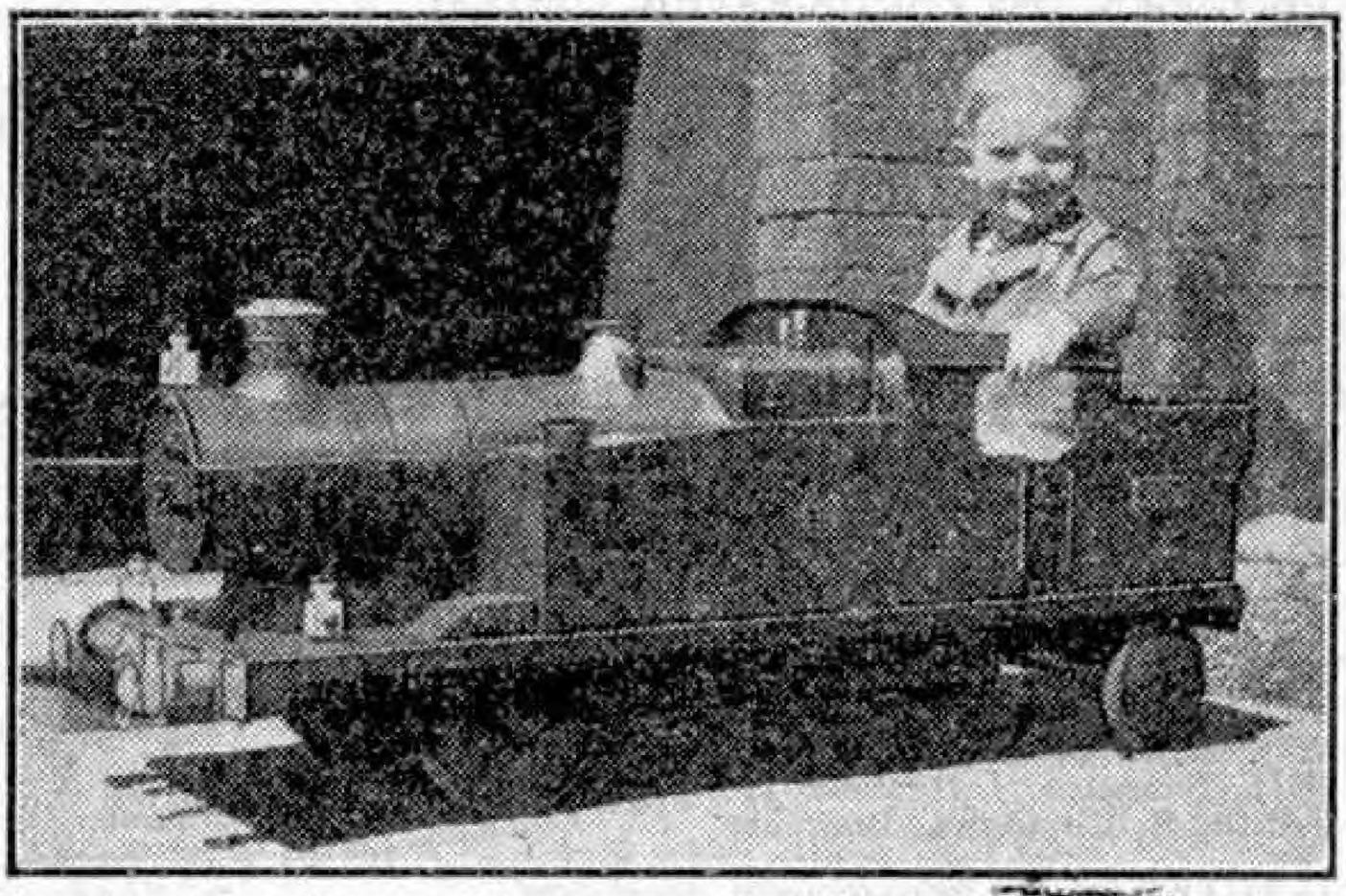
We left Croydon feeling that air travellers arriving at any of London's three airports have little to complain about. At all three courtesy, speed and quiet efficiency were the order of the day, and we remembered what a passenger from the States had said when entering Heath Row's tents in the early days—"Maybe these things were meant for elephants, but I can land and be on my way to London in 20 minutes. It sometimes takes two hours in America"—And that's what counts.

The Birth of a Bell—(*Continued from page 63*)

Any less number is designated a "chime." The carrillonneur, as the bell player is called, plays by means of a clavier, which is constructed similarly to the manuals and pedals of an organ. The keys of the manual are made of wood, round in shape and about an inch in diameter. There are two rows, representing the white and black notes of the organ. The pedal keys are also of wood, flat in shape, and so placed as to be easily actuated by the feet of the carillonneur. Sometimes the carillon is fitted with an ivory keyboard and driven by an electro-pneumatic installation, and the lightest touch on the keys will cause the hammers to strike the bells.

During the present century some of the finest masterpieces of the art and craft of bell-founding have been turned out from our English foundries at Croydon, Loughborough and Whitechapel. Huge carillons of large numbers of bells have gone to cathedrals, churches and colleges of many countries, as well as countless ordinary peals, single bells and chimes to all parts of the world.

Splendid examples of these are the bells made for Liverpool Cathedral. The largest is 14½ tons in weight, a ton heavier than "*Big Ben*" of Westminster, and in Great Britain only "*Great Paul*" of St. Paul's Cathedral is larger. An article on Liverpool Cathedral's bells will appear in next month's "*M.M.*"



Many readers will envy this young engine driver, Robin Jones, Liverpool 13. His fine engine, which is pedal driven, is based on the G.W.R. "56XX" 0-6-2 tank class. It was constructed by his father and is mainly of wood. The engine is remarkably complete in detail for a model of this kind, even to such items as spare lamps and brackets.

Parsons Turbo-Alternator—

(*Continued from page 61*)

a machine to generate at 36,000 volts was constructed for the Brimsdown power station, London. This machine develops 25,000 kW. at 3,000 r.p.m. To-day turbo-alternators to develop no less than 50,000 kW. at 3,000 r.p.m. and generating at 36,000 volts are under construction at Heaton Works.

To furnish electric power at the rate at which it is now consumed by large communities involves the existence of generating stations with capacities ranging up to several hundreds of thousands of kilowatts. The prime movers have to be of proportionate size, otherwise the multiplication of plant and of switchgear would become so great as to render operation and control inordinately difficult. Furthermore, both capital and operating costs are so much reduced by the employment of large machines that the latter are necessary on the grounds of economy alone.

A Railwayman Abroad, 1944-46—

(*Continued from page 73*)

station had its complement of people, many of them with all their possessions bundled together or stowed on little handcarts, waiting for one of the civilian trains—a ramshackle collection of decrepit four-wheelers and six-wheelers, with perhaps six different owning countries represented in a single train—and not a glass window between the lot! What matter if there were not a seat nor standing room inside—soon every inch of space on the footboards and between the coaches was crammed—and the German driver of the "17" or "38" class 4-6-0 which is hauling the train had to appeal to the police to move them from the front of the engine, so that he could see to drive.

Such were everyday scenes on the *Reichsbahn* during the months which followed the defeat of Germany; some runs on the German railways will be described in the next and final article.

Fireside Fun

Customer: "I must have a hat to suit my head."
Shop Assistant: "Certainly, sir. Now here is a good line in soft hats. Just the thing for you."

* * * *

"What's the best way of improving the flavour of salt?"
"That's easy. Sprinkle it in a fresh boiled egg or on a good juicy steak."

* * * *

Happy Traveller: "That was a first-class journey."
Keen Ticket Collector: "In that case there'll be 2/11 excess."

* * * *

"Two bodies meeting violently produce heat."
"Not always, sir. I once hit another boy hard, and he knocked me cold."

* * * *

"That man makes waste paper baskets."
"H'm, I shouldn't like such a humdrum, prosy business."
"Oh, it's not so bad. There's really a lot of poetry in waste paper baskets, you know."

* * * *

"That boy of yours seems a bit tired, doesn't he?"
"Tired—he's lazy, and greedy too. He has only two complaints. One is that he has to stop eating to sleep, and the other that he has to stop sleeping to eat."

* * * *

"You ought to get up early and do some exercise. The brightest boy I know swims across the river three times before breakfast every day."
"He isn't so bright. If he were he would make it four times across and get back to the side where his breakfast is waiting for him."

* * * *

"Have you any ancistors in your family, Rafferty?"
"Ancisters? What's thim?"
"People you spring from, you know."
"Arrah now, Kelly, I'm a Rafferty, and the Rafferty's don't spring from anybody. They spring at thim."

* * * *

THIS MONTH'S HOWLER

A new development in the last war was the use of parasite troops.

BRAIN TEASERS

NOT ON THE SQUARE!

Here is a word square, in which the letters are represented by numbers.

5	6	1	7	4
6	2	2	6	7
1	2	3	4	6
7	6	4	7	1
4	7	6	1	5

The numbers run from 1 to 7 and represent in order the letters in the name of an old-fashioned weapon. WARNING—There is a little catch in the clue.

S.W.C.

* * * *

EASY COUNTING

How many bricks of standard size would be required to finish a 9 in. wall, that is one with double layers of bricks, 25 ft. long and 6 ft. high?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

Of the two baths in the first of last month's brain teasers the one with the 6 in. pipe would be filled the more quickly. Pipe capacity depends on the square of diameter, and one pipe with a diameter of 6 in would have four times the capacity of one of 3 in. diameter and therefore twice the combined capacity of two pipes of this size.

The largest amount of silver required in our second puzzle is 15/9. This is made up of three half-crowns, four florins, and one silver threepenny bit, a few of which are still in circulation.

The two-figure numbers that multiplied by themselves give four-figure numbers must be between 32 and 99, and of these there are only four that on squaring give four-figure numbers in which the first and third figures are the same. These are 45, 56, 81 and 91, and of these again only the first gives a square with 0 in it. The solution therefore is 45, which on squaring gives 2025.

The four names in our fourth puzzle are Hammond, Stephenson, Churchill and Shakespeare.

* * * *

"Does this train stop at Euston?"
"Real old smash if it don't, sir."

STAMP ADVERTISEMENTS

(see also pages 88 and 90)

MECCANO MAGAZINE

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Readers' Sales and Wants. Private advertisements (i.e., not trade) are charged 1d. per word, minimum 1/-. Cash with order. Readers' advertisements are published as soon as possible; inclusion in the first issue after receiving them cannot be guaranteed.

READERS' SALES AND WANTS

SALES

As new, "Meccano Magazines," Jan. 1943–Jan. 1945 (complete); also July 1945, Nov. 1945, Dec. 1945, Jan. 1946, May 1946; lot 10/-. Meccano Outfit No. 7 with Magic Motor; offers.—Banbury, West Park, Iddesleigh, Winkleigh, Devon.

Large quantity Red and Green Meccano; Original No. 7 Outfit with 6-volt Electric Motor, many extras; Passenger Hauling Model Traction Engine at present constructed. Offers.—"M.M." Box 11.

Large quantities of Meccano and Hornby Equipment; 21 inch Model Racing Yacht; also a Gas-fired Boiler and Stationary Steam Engine. Write for details.—K. C. Bentley, 49, The Chine, Grange Park, London N.21.

Two Hornby Clockwork Tank Engines; Six Bogie Coaches; Three other Coaches; Two Crossovers; and various types of Points and Rails. Write—H. R. Purser, 31, Conduit Road, Stamford, Lincs.

"Meccano Magazines," 1940, 1941, 1942, 1943, 1944, 1945, 1946; good condition. What offers? Apply—D. A. Lilwall, Tyn-y-Borth, Tal-y-Cafn, Denbighshire.

Odd Numbers "Meccano Magazines"; "Railways"; "Railway Magazines"; "Locomotives," 1944–1946; good condition; published price. Stamp for list.—K. Measures, 86, Glenesk Road, Eltham, London S.E.9.

"Meccano Magazines," November 1930 complete to date; good condition; £5 or nearest.—B. Styles 292, Main Road, Romford, Essex.

Smith's Cycle Speedometer and Mileage Recorder (26 in.), perfect, 33/-; "M.M.s"; "Aeroplane Spotters"; "A.T.C. Gazettes," etc., and a few Books; 2½d. for particulars.—D. Jones, 55 Bowlane Avenue, Bridgend, Glam.

Ecko H.T. Unit, A.C., 200–250 volts, 30/-; Kit of Parts for Two-valve Set, described in "Hobbies" June 1946, 21/-; Case of Dissecting Instruments, 10/-; Waterproof Pike-fishing Line, 40 yards, 5/-; Box of Assorted Fishing Tackle, Floats, Hooks, Hooks to Gut, Lines, Casts and Shot, 7/6. Send S.A.E. for list of Fishing Tackle and Naturalists' Instruments.—J. W. Gilsley, 42, Edward Street, Redditch, Worcs.

"M.M.s" 1931–1939, good condition. Offers?—Watling, 6, Overhill Way, Beckenham.

Large quantity of Naval, Military and Air Force Books; also Comics for sale. S.A.E. for list. Minibrix Set 1. Offers to—Killick, 95, High Street, Egham, Surrey.

"Meccano Magazines" 1936–1941 complete; good condition. Also 24 odd numbers, 1929–1935. Write—Sutherland, 1, Fitzwilliam Street, Cambridge.

WANTS

Hornby Dublo 0 Locos (Electric), Rolling Stock and Electric Points; will exchange small Eight-Day Clock (luminous dial); also Socket Set complete with extensions and handles; ideal for car or motor-cycle owner. Write for list.—A. D. McIntyre, 5, Espedair Street, Paisley.

Hornby Dublo Electric Passenger Train Set, Points and Accessories; if possible, also. Transformer 225/250 volts.—B. McCulloch, 7, Luncarty Place, Sandyhills, Glasgow E.2.

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